

## **Appendix E**

### **Evaluation of Need for an Additional Groundwater Monitoring Well at Landfill I**

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#### **PRELIMINARY ANALYSIS**

##### **State the Problem**

Is the existing monitoring network for Landfill I adequate to detect potential VOC impacts to groundwater? (Potential impact from metal constituents and polyaromatic hydrocarbons is eliminated on the basis of GWSCREEN modeling).

##### **Decision Statement**

Are there potential VOC sources at Landfill I that could impact groundwater above MCLs or risk-based concentrations that would not be detected by the current monitoring network?

Alternative 1: No. Additional wells are not needed. Continue to monitor groundwater per the OU 4-12 Post-ROD Monitoring Plan.

Alternative 2: Yes. Install additional well(s) downgradient of potential source areas.

##### **Inputs to the Decision**

- History of operations and identification of potential source areas at Landfill I as documented in the Track 2 Scoping Report, the OU 4-12 RI/FS Work Plan and the OU 4-12 RI/FS.
- Personnel interviews and waste inventory extrapolations from Landfill II records for the Western Waste Trench as documented in the Track 2 Scoping Report, the OU 4-12 RI/FS Work Plan and the OU 4-12 RI/FS.
- Waste disposal inventory to the East Hole area of Landfill I as documented in the Track 2 Scoping Report, the OU 4-12 RI/FS Work Plan and the OU 4-12 RI/FS.
- Soil gas surveys Landfill I and III from the Track 2 Scoping Report and OU 4-12 RI/FS.
- Vadose zone vapor concentrations from this report (OU 4-12 Monitoring Report—1996–1998).
- GWSCREEN runs for Landfill I and/or extrapolation from Landfill II GWSCREEN runs.
- Groundwater flow direction at CFA landfills based on chloride isoconcentration contours presented in this report and State of Idaho INEEL Oversight Program groundwater plume maps.

## **Define the Study Boundaries**

**Spatial Boundaries:** Surficial and vadose zone vapor measurements; portions of the Snake River Plain Aquifer upgradient and downgradient of Landfill I.

**Temporal Boundaries:** Dates of operation of the landfill: Western Waste Trench from 1950 to 1971 and the East Hole from 1982 to 1984. Groundwater and vadose zone vapor analytical data from 1996 through 1998; soil gas survey data from 1993.

## **Decision Rule**

If potential source areas associated with Landfill I (1) do not pose a risk to groundwater, or (2) are covered by the existing groundwater monitoring network, then no additional groundwater monitoring wells are required.

## **EVALUATION OF INPUTS TO THE DECISION**

The following information is a synopsis of data presented in the Landfill I Track 2 report, the OU 4-12 Remedial Investigation/Feasibility Study Work Plan, and the OU 4-12 RI/FS Report. This summary is an attempt to present relevant information with respect to Landfill I's history, waste types and areal extent.

## **Subunits**

Landfill I is 8.25 acres and consists of three separate areas where wastes were disposed: the Rubble Landfill (5.5 acres), the Western Waste Trench (2 acres) and the Northern Waste Trench (0.75 acre) (Figure E-1). It should be noted at the outset that the Western Waste Trench is west of the present-day road separating Landfill I and Landfill III and is actually covered by the Landfill III cap (Figure E-2).

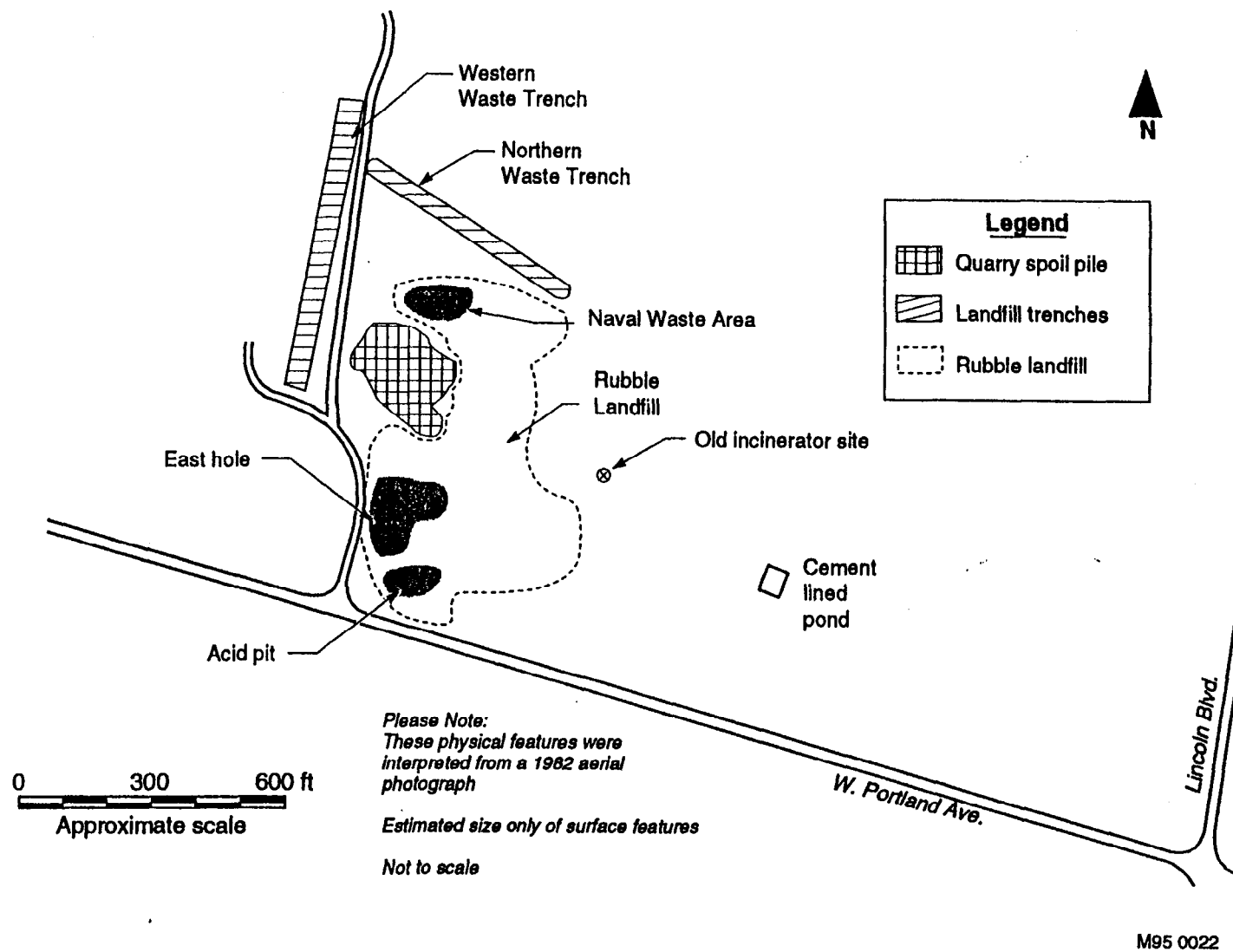
The presence of the Northern Waste Trench was inferred from aerial photos and no records were found regarding disposal history there. On the basis of the soil gas survey (discussed below), there appear to be no significant volatile organic sources that could pose a risk to groundwater. Therefore, this summary will focus on the Rubble Landfill and the Western Waste Trench.

### **Western Waste Trench**

Personnel interviews reveal that prior to usage of Landfill II, site wide wastes were initially deposited to the Western Waste Trench (WWT) between 1952 and 1970. These wastes were crushed and burned, as was the practice at the time, prior to covering with soil. Two dump trucks operated at the site and one person operated equipment to cover the wastes. The WWT consists of approximately six trenches that are 8 ft wide, 10-15 ft deep and 550 ft long.

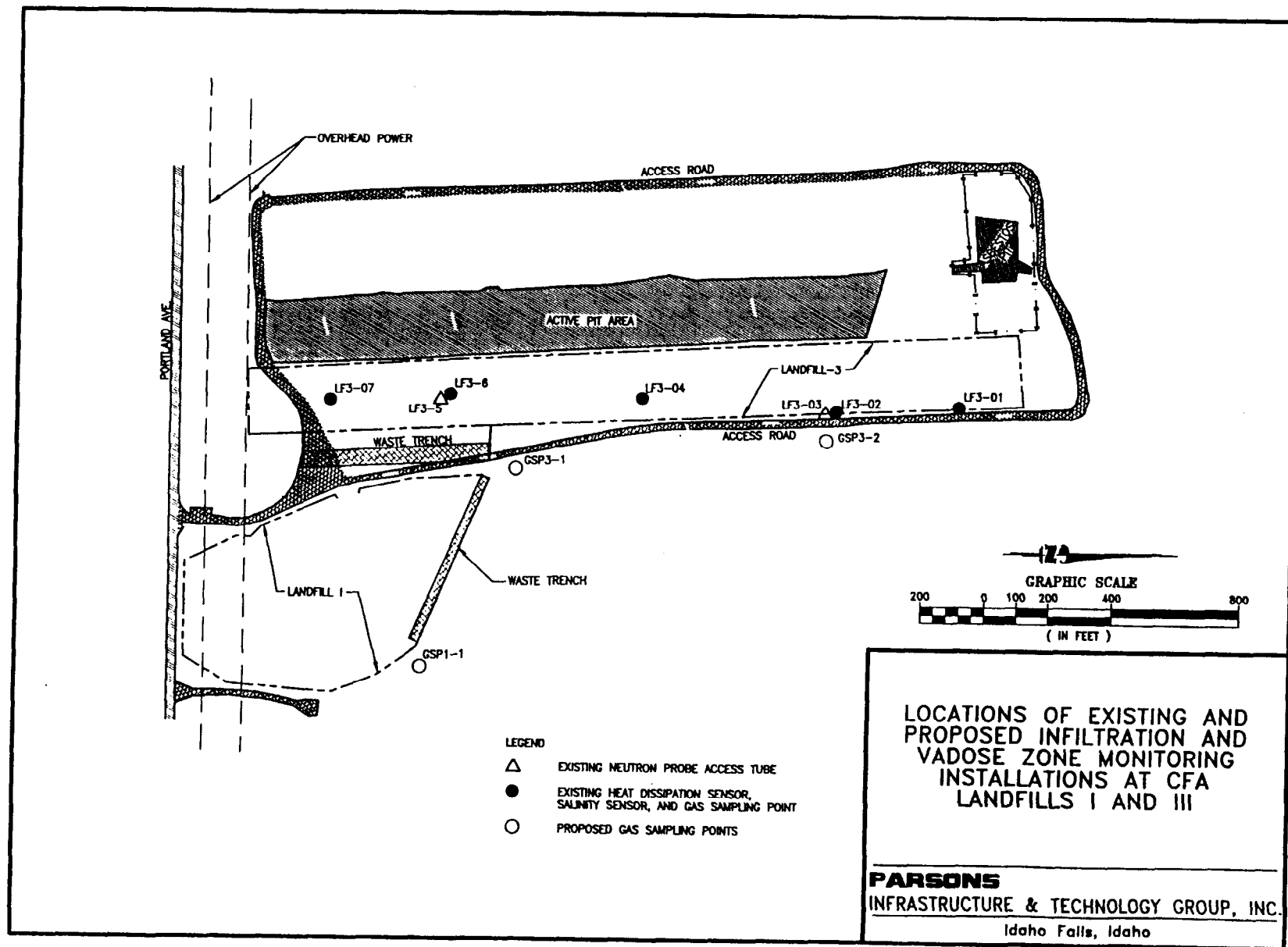
### **Rubble Landfill**

The bulk of Landfill I was actually a gravel quarry where construction/demolition wastes were stored. Rubble such as construction/demolition wastes, tires, lumber, piping and empty drums were deposited in this portion of the landfill between 1952 and 1971. This area was later labeled the Rubble Landfill and the construction debris was covered in 1991. Based on personnel interviews, no hazardous



**Figure E-1.** Landfill I and subunits rubble landfill, western waste trench, and northern waste trench.





**Figure E-2.** Locations of existing and proposed infiltration and vadose zone monitoring installations at CFA Landfills I and II.

wastes, liquid wastes or sludges were disposed to the main part of the Rubble Landfill. Those types of wastes went to the Western Waste Trench that was operating at the same time.

During 1982 to 1984, the East Hole area of the Rubble Landfill received a portion of site wastes. Site wastes were disposed to Landfill III (west of Landfill I) during this interval, hence the designation East Hole.

## Waste Profiles for the Western Waste Trench and the East Hole

### Western Waste Trench

Although no written records were kept for the wastes disposed to the WWT from 1952 through 1970, there are personnel interviews regarding disposal practices at the WWT. Given the long time frame of landfill operation, approximately 20 years, the personnel interviews may not be fully inclusive of waste disposal history. Additionally, records were kept for the waste types disposed to Landfill II between 1971 and 1986. It can be inferred that wastes disposed to the WWT were similar to those disposed to Landfill II since CFA has had the same mission and similar processes over time. The IWMIS database records for Landfill II show that the largest percentages of the wastes were nonhazardous (98% by weight). The typical wastes received were wood, scrap lumber, asphalt, masonry, concrete, dirt, gravel, trash, sweepings, and other types of municipal-type wastes (Table E-1). Potentially hazardous wastes consisted mostly of sludges, with minor amounts of paint and liquid wastes, and comprised 1-2% of the total waste volume. It should be noted that personnel interviews state that liquids or sludges were burned in the WWT, whereas they were not burned in Landfill II. However, burning does not guarantee that a portion of the liquids or sludge waste intended to be burned has not infiltrated into the subsurface to some degree prior to ignition, or there may have been incomplete combustion.

### East Hole

During 1982 to 1984, the East Hole received portions of the site wide wastes that might have contained hazardous wastes. Table E-2 contains a listing of the volumes and types of wastes that went to the east hole. The hazardous portion contained approximately 8 cu. meters of oil sludge, 2 cu. meters of sump sludge, 22 cu. meters of paint. Empty acid tanks were deposited to the "acid pit" slightly to the south of the "east hole."

**Table E-1.** Summary of Disposal of Site-Wide Municipal Type Wastes.

|                    | Landfill I |           | Landfill II | Landfill III |
|--------------------|------------|-----------|-------------|--------------|
|                    | WWT        | East Hole |             |              |
| Dates of Operation | 1952-71    | 1982-84   | 1970-1982   | 1982-1984    |
| Areal Extent       | 2 acres    | ~1 acre   | 15 acres    | 12 acres     |

**Table E-2.** Estimated waste volumes for Landfill I, rubble landfill from 1982 to 1984 (estimates based on Landfill 1 logbook.

| Waste Type                  | Total Volume<br>(m <sup>3</sup> ) |
|-----------------------------|-----------------------------------|
| 1. Trash, sweepings         | 940                               |
| 2. Cafeteria garbage        | 44                                |
| 3. Wood, scrap lumber       | 4,162                             |
| 4. Masonry, concrete        | 2,852                             |
| 5. Scrap metal              | 163                               |
| 6. Weeds grass, trees       | 138                               |
| 7. Dirt, gravel             | 1,231                             |
| 8. Asphalt                  | 3,094                             |
| 9. Asbestos                 | 33                                |
| 10. Other                   | 103                               |
| Boxes of hazardous material | 29                                |
| Sludge                      | 8                                 |
| Slag                        | 2                                 |
| Conductors                  | 3                                 |
| Tires                       | 8                                 |
| Resins                      | 3                                 |
| Lagging                     | 9                                 |
| Barrels/buckets/drums       | 190                               |
| Roofing                     | 102                               |
| Insulation                  | 234                               |
| Gilsolate/gilsotherm        | 7                                 |
| Paint                       | 22                                |
| Acid Tanks                  | 2 empty tanks                     |
| Rocks                       | 67                                |
| Sodium nitrate              | 2                                 |
| Calcium nitrate             | 2                                 |
| Sump sludge                 | 2                                 |

## Landfills I and III Soil Gas Surveys

A shallow soil gas survey was performed over Landfill I in July 1992 by TARGET Environmental Services. Table E-3 summarizes the compounds and maximum detected concentrations from the Landfill I active soil gas survey. The samples were taken from depths ranging from 2 to 4 ft below land surface (bls) with most of the samples taken from 4 ft bls. The samples were analyzed for various VOCs including 1,1,1-trichloroethane (TCA), tetrachloroethene (PCE), trichloroethene (TCE) and others.

A shallow soil gas survey was also performed over Landfill III which borders Landfill I to the west (Figure E-2). The samples were taken at a depth of 4 ft bls during November 1993. The samples were analyzed for various VOCs including TCA, PCE, TCE. Data from Landfill III were evaluated because soil gas data from Landfills I and III overlap near the area called the Western Waste Trench and the landfills are immediately adjacent to one another. Therefore, it makes sense to look at both data sets to interpret the soil gas results and assess potential impacts to groundwater.

**Table E-3.** Summary of compounds analyzed for Landfill I soil gas survey and maximum concentrations detected.

| Compound                       | Maximum Concentration<br>(ug/L)<br>Landfill I |
|--------------------------------|---|
| 1,1-Dichloroethene             | 39  |
| 1,1,2-Trichlorotrifluoroethane | 9.1   |
| Methylene chloride             | <1.0  |
| Trans-1,2-dichloroethene       | <1.0  |
| 1,1-Dichloroethane             | 5.3   |
| Cis-1,2-dichloroethene         | 2.2   |
| Chloroform                     | 0.45  |
| 1,1,1,-Trichloroethane         | 21  |
| Carbon tetrachloride           | <0.05   |
| Trichloroethene (TCE)          | 11  |
| 1,1,2-Trichloroethane          | <0.10   |
| Tetrachloroethene (PCE)        | 4.65  |

Figures E-3 and E-4 are soil gas contour maps of Landfills I and III for 1,1,1-TCA and PCE, respectively. These maps demonstrate that the only area with a cluster of slightly elevated concentrations is located in the southeast corner of Landfill III. There are only sporadic isolated detections over the Rubble Landfill. The areas known as the "East Hole" and the "Acid Pit" (where empty tanks were buried) do not show elevated VOC concentrations, and therefore can be eliminated as potential source areas that could impact groundwater. It should also be noted that the 10 µg/L concentration was chosen arbitrarily to visually highlight the data on the maps. That number does not signify a source that would pose a risk to groundwater. It is highly unlikely that any of the VOC concentrations observed in the soil gas surveys represent subsurface sources that would pose a risk to groundwater at a depth of 500 feet. However, if any area could pose a risk to groundwater, it would be the southeast corner of Landfill III; wells LF3-08 and LF3-09 are positioned to detect any VOC impacts from that area.

## Deep Soil Gas Concentrations in Boreholes GSP 3-1 and GSP 1-1

### Impact of deep soil gas concentrations measured in wells GSP 1-1 and 3-1

In addition to the surface soil gas measurements, soil gas concentrations have been measured down to 107 ft bls near the northern end of Landfill I in GSP wells 1-1 and 3-1 (Figure E-4 and E-5). The highest concentrations measured are shown in Table E-4.

One way to gauge the potential impact of VOCs at Landfill I is to compare deep soil gas concentrations to the preliminary remediation goals (PRGs) calculated for carbon tetrachloride at the RWMC Subsurface Disposal Area (SDA), an INEEL site with similar geology and hydrologic conditions. The PRGs are the estimated maximum soil gas concentrations that will not cause groundwater concentrations to exceed MCLs. The PRG range for gas-phase carbon tetrachloride at the SDA is 30 to 200 parts per million by volume of air (ppmv) at 100 to 200 ft bls (Record of Decision Operable Unit 7-08, November 1994). The MCL for carbon tetrachloride is 5 µg/L, the same as for TCE and PCE. Therefore, it can reasonably be assumed that concentrations of TCE and PCE would have similar PRGs of 30 to 200 ppmv. The MCL for 1,1,1-TCA is 200 µg/L and the corresponding PRG would be much higher on the order of 1,000 ppmv. Given the similar geology and hydrologic conditions at the sites, and the similar nature of the contaminants (chlorinated solvents), it is reasonable to assume that the PRG calculated for the SDA can be applied at the CFA Landfills to make rough approximations.

**Table E-4.** Maximum soil gas concentrations in GSP wells 1-1 and 3-1.

| Contaminant | Estimated PRG (ppmv) | Maximum Deep Soil Gas Concentration in GSP 1-1 (ppmv) | Maximum Deep Soil Gas Concentration in GSP 3-1 (ppmv) |
|-------------|----------------------|---|---|
| TCA         | 1,000                | 11 (77 ft)  | 14 (77 ft)  |
| PCE         | 30–200               | 0.22 (37 ft)  | 0.25 (37 ft)  |
| TCE e       | 30–200               | 1.4 (77 ft)   | .46 (37 ft)   |

\*CCl<sub>4</sub> and PCE and TCE have the same MCL of 5 µg/L. The MCL for 1,1,1-TCA is 200 µg/L.

Figure E-3. Distribution of 1, 1, 1-TCA in soil gas at CFA Landfills I and III.

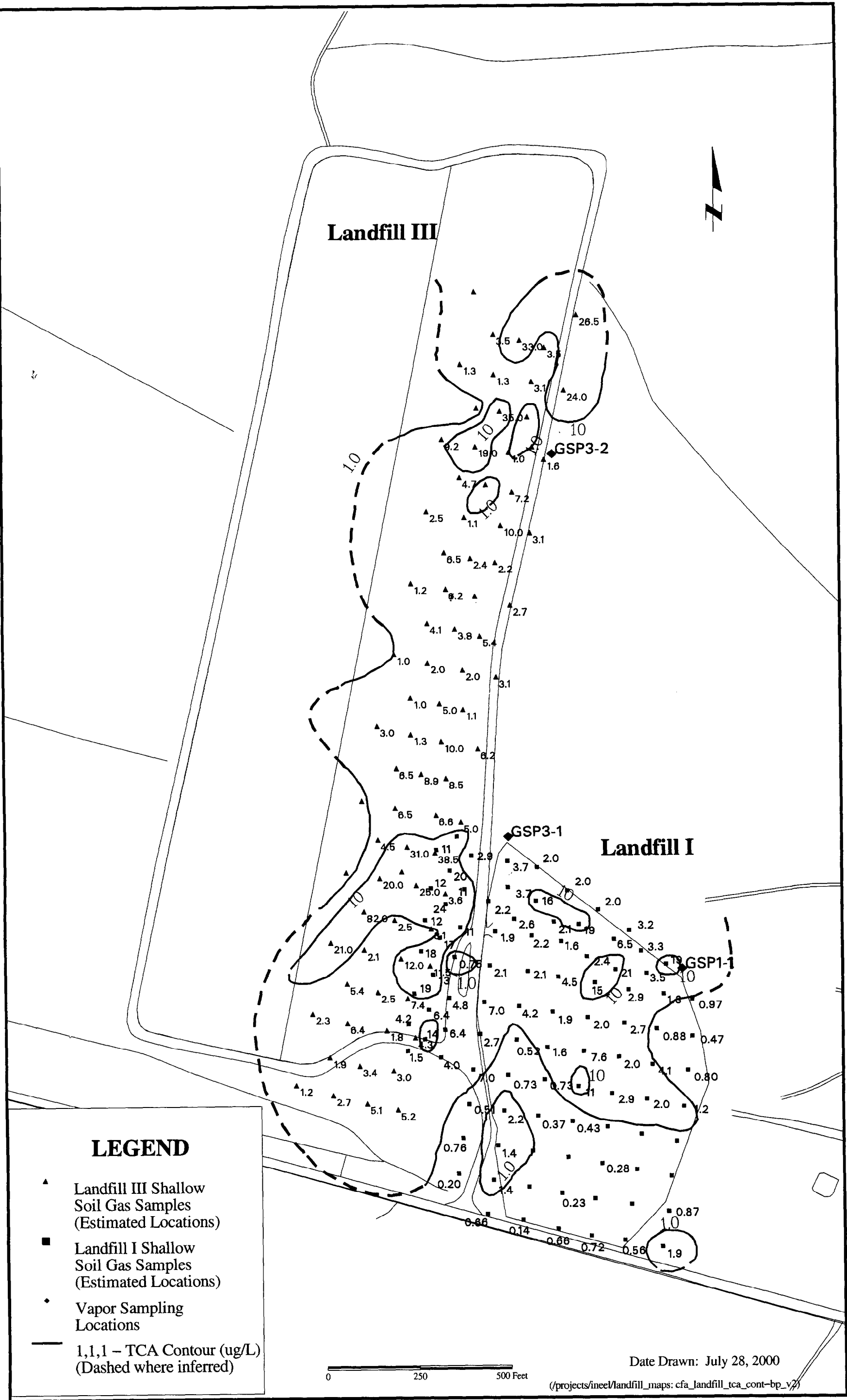
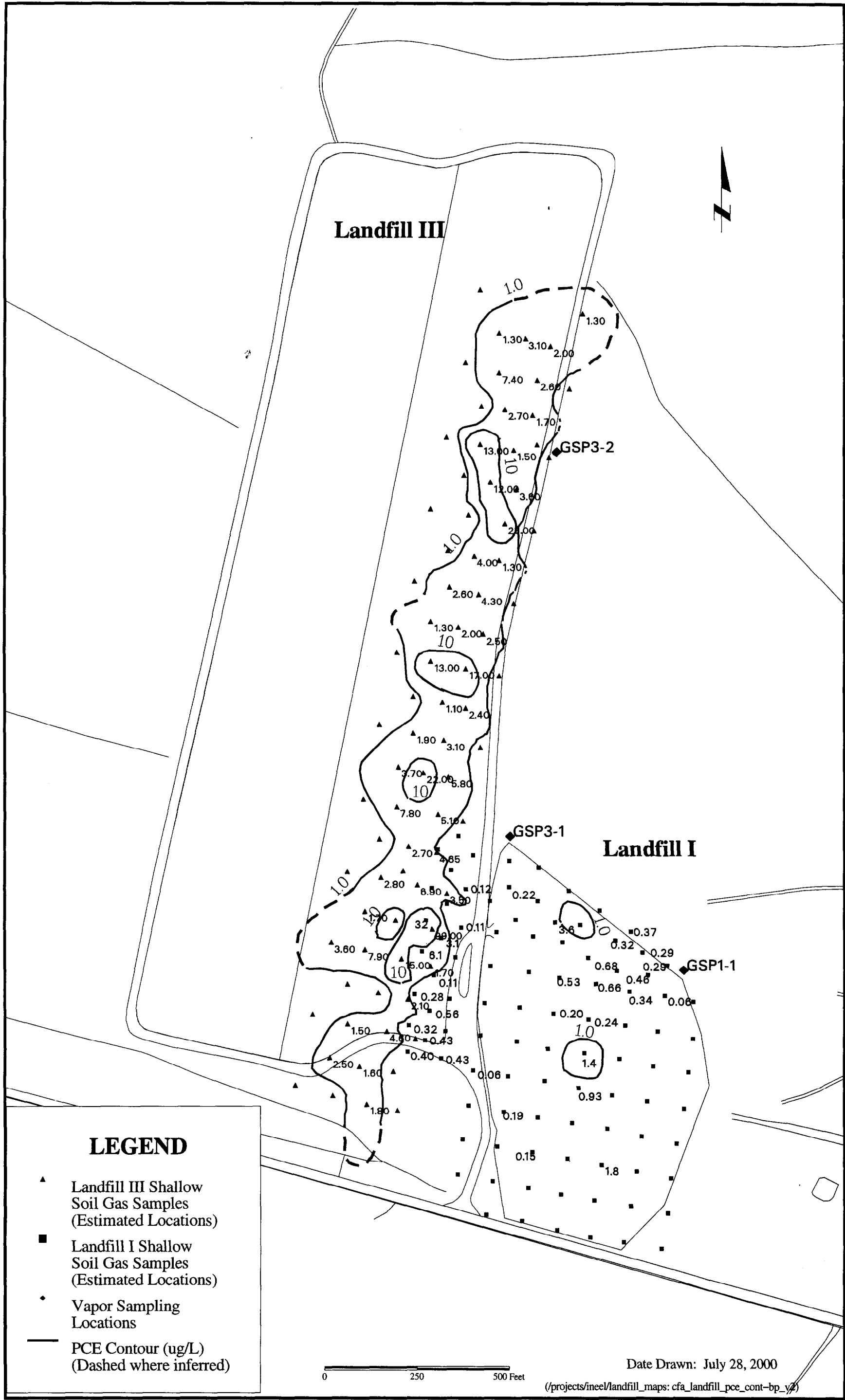


Figure E-4. Distribution of Tetrachloroethene (PCE) in soil gas at CFA Landfills I and III.



The maximum PCE and TCE concentrations measured in the deep soil gas in the GSP wells at Landfill I are 0.25 and 1.4 ppmv, respectively. These concentrations are much lower than the 30 – 220 ppmv PRG range. The maximum TCA concentration measured in the GSP wells at Landfill I is 14 ppmv, which is also much lower than an estimated PRG of 1,000 ppmv. Given these comparisons, it is highly unlikely that the contamination in the vicinity of the GSP wells will impact the SRPA above MCLs.

### **Impact of Estimated Deep Soil Gas Concentrations below the Rubble Landfill**

Although a shallow soil gas survey was conducted over the Rubble Landfill, VOC concentrations in the deep soil gas below the Rubble Landfill are not known since there are no gas port wells in that area. However, GSP 1-1 is located at the fringe of the shallow soil gas survey and provides data at depths of roughly 12, 37, 77, and 107 ft bls. Therefore, it is possible to interpolate soil gas concentrations at depth in the central portion of the Rubble Landfill using the shallow soil gas data in that area in combination with the deeper data from GSP 1-1.

TCA was used because it was the most frequently detected VOC. The maximum concentration of TCA detected in the shallow soil gas survey over the Rubble Landfill was 21 ppmv (Figure E-3). The shallow soil gas sampling point nearest the GSP 1-1 reported a TCA concentration of 19 ppmv, which is near the maximum detected value. Therefore, the TCA concentrations at depth below the Rubble Landfill are likely comparable to those encountered in GSP 1-1 and, inferring from the RWMC PRG, would not likely pose a risk to groundwater.

## **GWSCREEN Modeling**

GWSCREEN modeling was conducted for the WWT for polyaromatic hydrocarbons as well as chromium, lead and silver in the OU 4-12 RI/FS. The modeling indicated that none of these constituents pose a risk to groundwater. These results can be extrapolated to indicate that metal contamination from the East Hole, which received a much smaller volume of waste over 2 years (versus 20 years for the WWT), also would not pose a risk to groundwater. GWSCREEN runs are included at the end of this appendix.

Although no GWSCREEN modeling was conducted for the WWT or the East Hole for VOC constituents, 13 VOCs were evaluated for impact to groundwater from Landfill II, which was known to receive liquid wastes. None of the 13 compounds posed a risk to groundwater. The GWSCREEN runs for Landfills I and II are presented in the OU 4-12 RI/FS (INEL 1995). Considering that the WWT and the East Hole received much smaller volumes of waste (inferred from depth and dimensions) than Landfill II and that the wastes were burned, the VOC modeling results from Landfill II can be used to infer that neither the WWT nor the East Hole area would pose a risk to groundwater.

## **Groundwater Flow Direction**

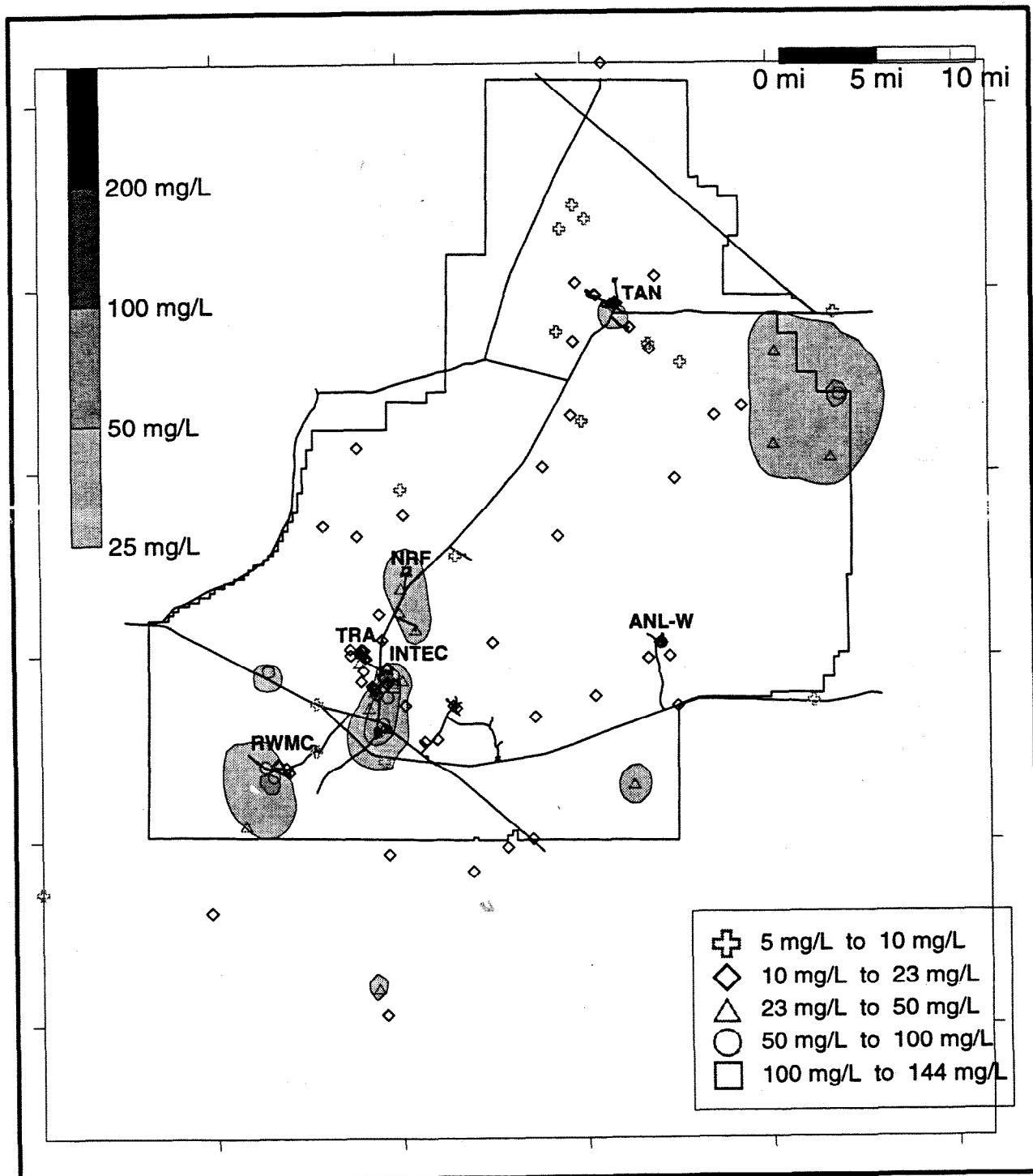
Figure C-26 in Appendix C shows the chloride isoconcentration map and the existing groundwater monitoring network in the vicinity of the landfills. The groundwater flow direction is to the south with a slight southwest component near Landfills I and III. Chloride plume maps generated by the State of Idaho Oversight Program show a south to southwest groundwater flow direction for the past 30 years (Figures E-6 through E-10). Wells LF3-08 and LF3-09 are downgradient and slightly southwest of the Western Waste Trench, the only area that could pose a risk to groundwater. Therefore, the existing monitoring network is adequate to detect any VOC contamination from the WWT and Landfill I.



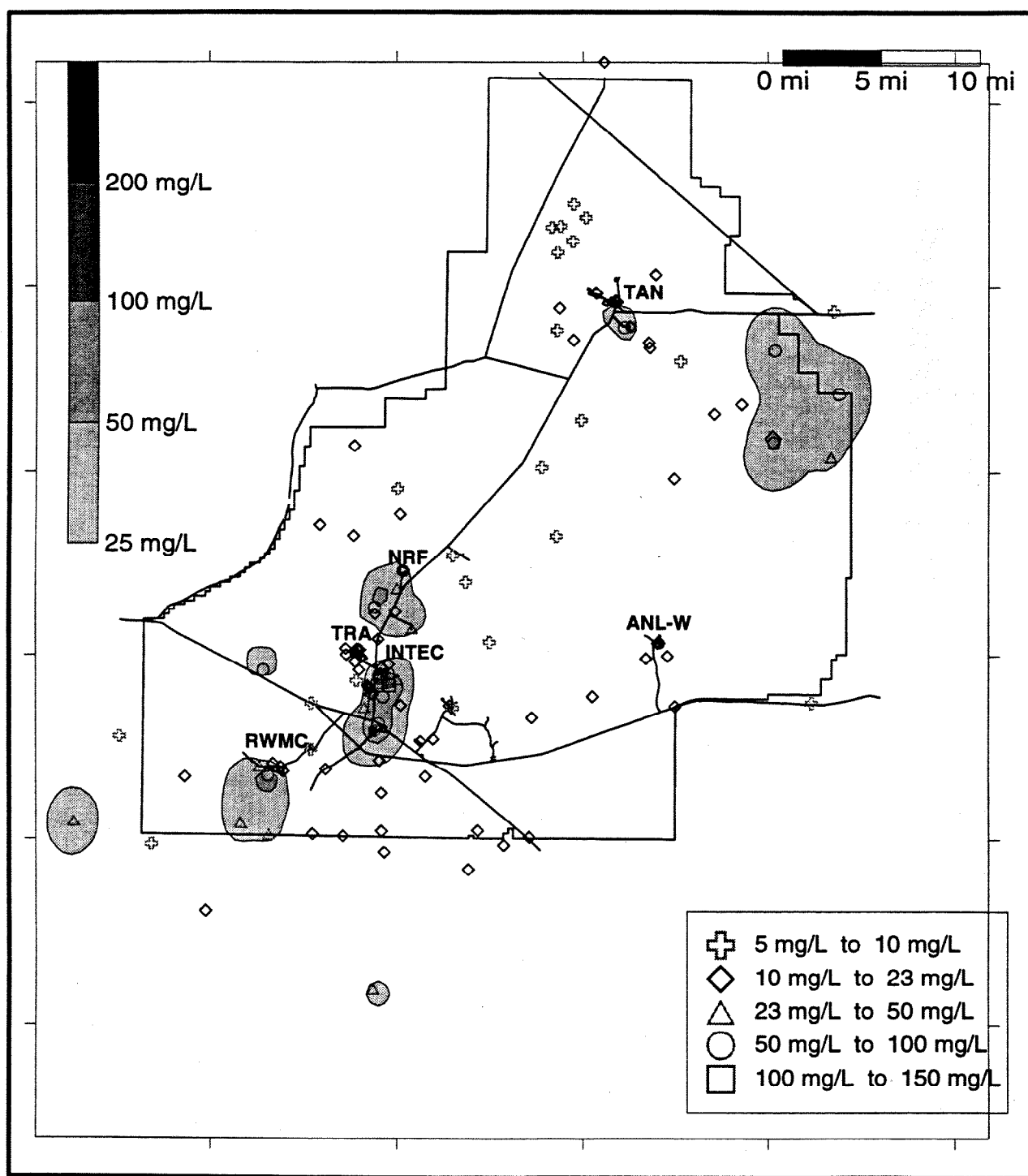
## SUMMARY

The DOE position is that the existing monitoring network adequately covers potential sources from Landfill I that might impact groundwater. This position is based on the following information:

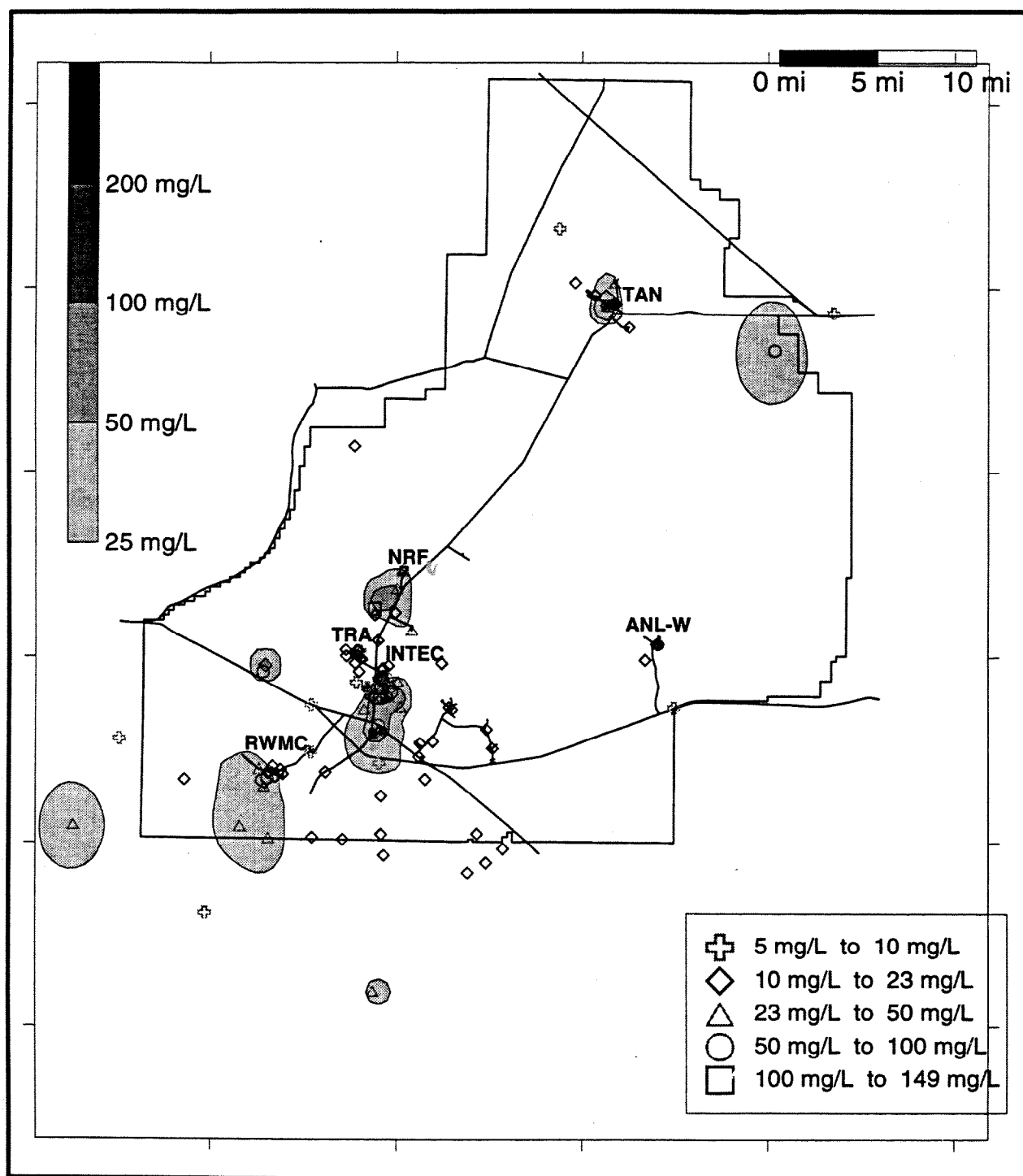
- Based on soil gas survey data, the Western Waste Trench subunit of Landfill I was the only portion of Landfill I that could potentially contain a VOC source (Figure E-3 and E-4).
- Because of contaminant dispersion in the vadose zone, LF3-08 and LF3-09 will intercept VOC contamination that might emanate from the Western Waste Trench.
- The existing wells LF3-08 and LF3-09 are downgradient of the Western Waste Trench subunit of Landfill I (the Western Waste Trench of Landfill I is actually under the southeast corner of the Landfill III cover). The groundwater gradient is to the south with a slight southwest component in the vicinity of the CFA landfills (see Figures C-26 and E-6 through E-10).
- GWSCREEN modeling has shown that Landfill I does not pose a risk to groundwater from metal constituents (RI/FS reports). Inferences from Landfill II VOC GWSCREEN modeling indicate that the WWT and East Hole, with much smaller volumes of waste, would also not impact groundwater.
- On the basis of this information, the existing wells, LF3-08 and LF3-09 south-southwest of the Western Waste Trench adequately monitor the portion of Landfill I that could pose a risk to groundwater and no additional wells are needed.



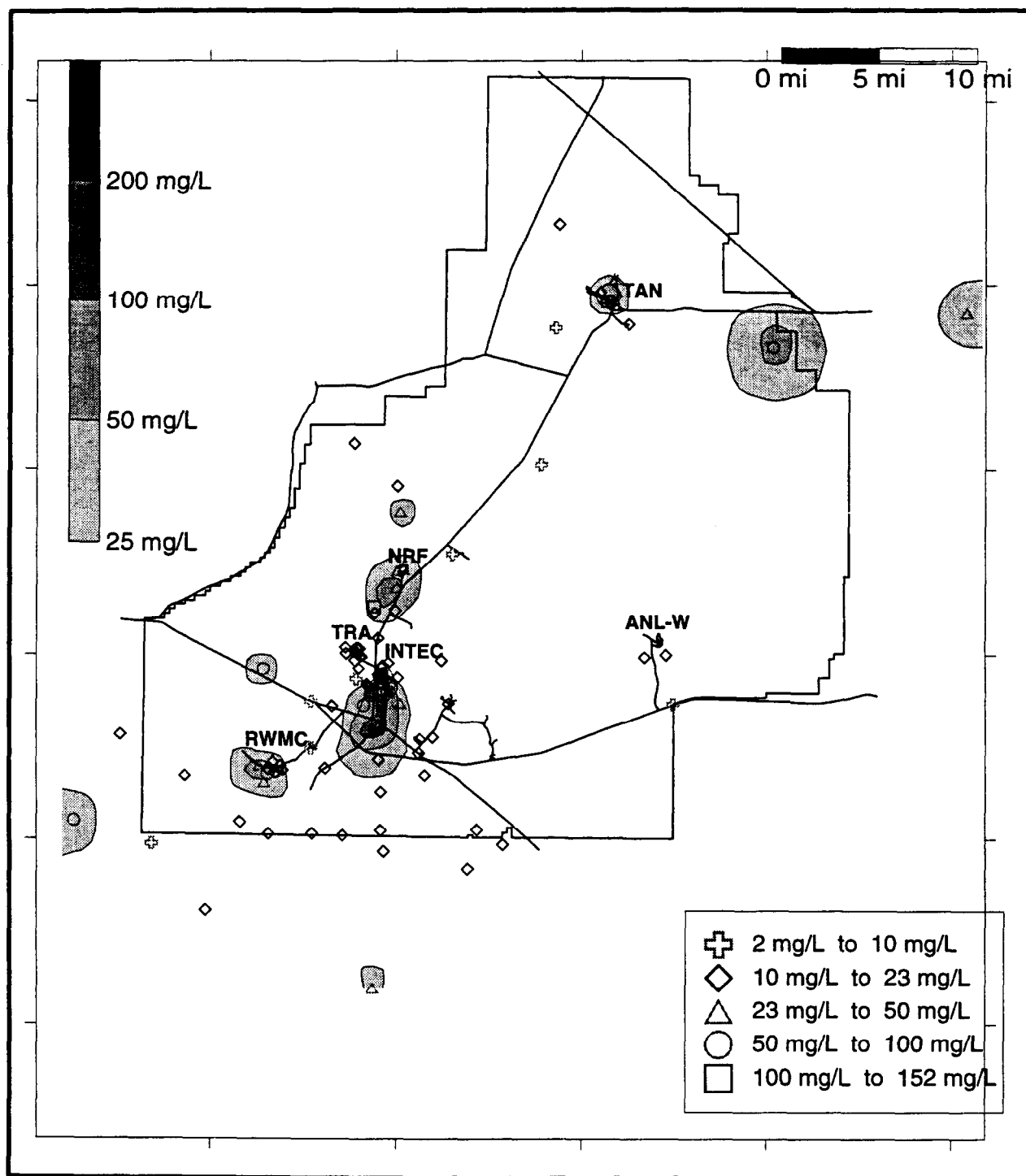
**Figure E-6.** Approximate Chloride Concentrations in the Snake River Plain Aquifer at the INEEL: 1976-1979.



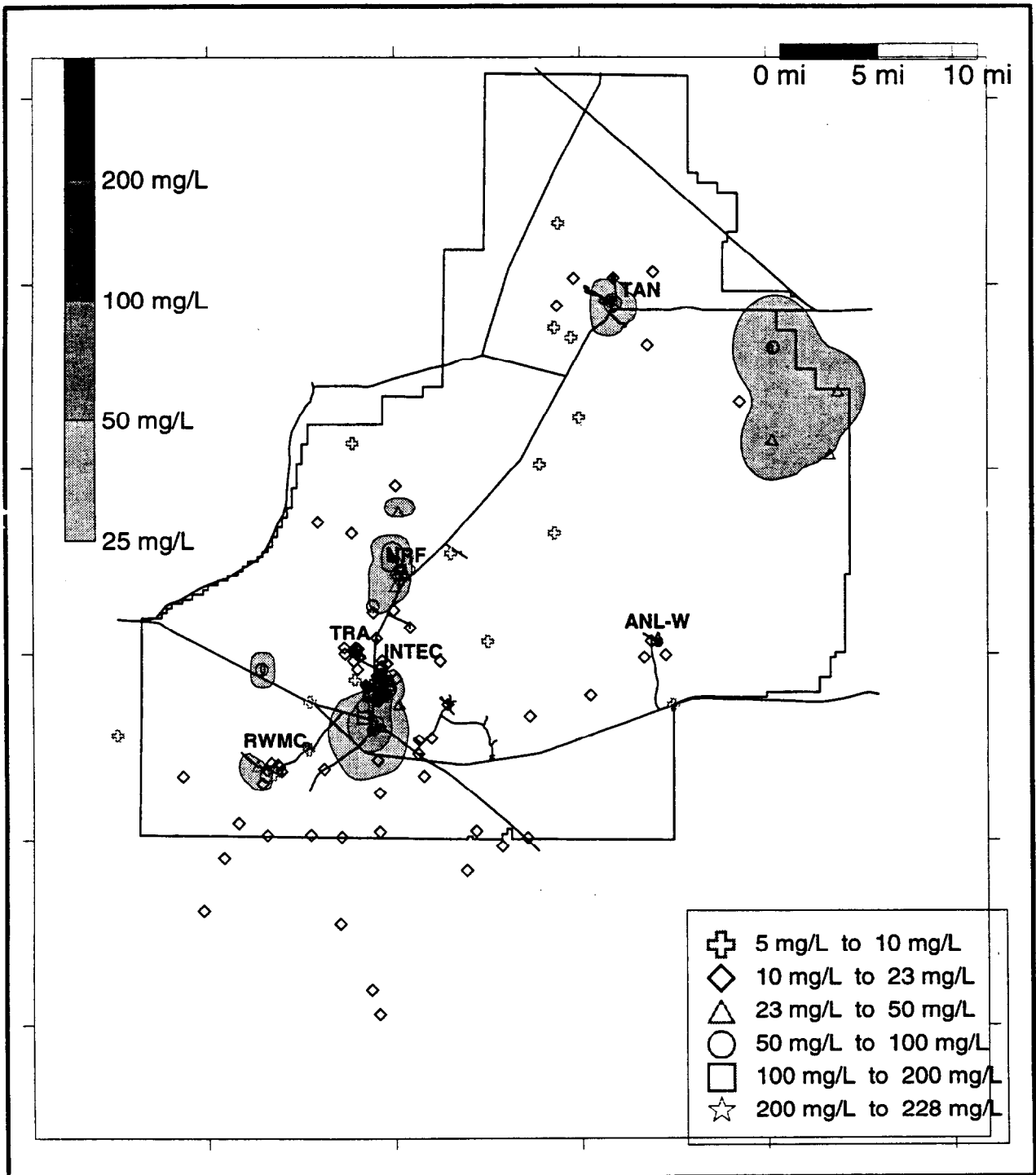
**Figure E-7.** Approximate Chloride Concentrations in the Snake river Plain Aquifer at the INEEL: 1980-1984.



**Figure E-8.** Approximate Chloride Concentrations in the Snake River Plain Aquifer at the INEEL: 1985-1987.



**Figure E-9.** Approximate Chloride Concentrations in the Snake River Plain Aquifer at the INEEL: 1988-1990.



**Figure E-10.** Approximate Chloride concentrations in the Snake River Plain Aquifer at the INEEL: 1994-1996.

# GWSCREEN Output Files for CFA Landfills (OU 4-12)

## CFA Landfill I - benzo(a)pyrene

TIME OF RUN 11:51:56.9  
DATE OF RUN 08/07/94  
INPUT FILE NAME: benzo-a.inp  
OUTPUT FILE NAME: benzo-a.out

### ACKNOWLEDGEMENT OF GOVERNMENT SPONSORSHIP AND LIMITATION OF LIABILITY

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```
*****
*
*   This output was produced by the model:
*
*           GWSCREEN
*   Version Control Copy, Version 2.02
*   A semi-analytical model for the assessment
*   of the groundwater pathway from the leaching
*   of surficial and buried contamination and
*   release of contaminants from percolation ponds
*           10-11-93
*           Arthur S. Rood
*   Idaho National Engineering Laboratory
*           EG&G Idaho Inc.
*   Subsurface and Environmental Modeling Unit
*           PO Box 1625
*           Idaho Falls, Idaho 83415
*****
```

>>> TITLE OF PROJECT:  
CFA Landfill I - benzo(a)pyrene

### GAUSSIAN QUADRATURE SOLUTION MODEL OPTIONS

IMODE: 4  
KFLAG: 1 (0)CONC VS TIME; (1)PEAK CONC AND LIMITING SOIL CONC  
IMODEL:1 (1) SURF OR BURIED SOURCE; (2)POND SOURCE; (3) TABULATED SOURCE FUNCTION  
>>> INPUT DATA

```
*****
NUMBER OF RADIOACTIVE PROGENY           0
LENGTH OF SOURCE PARALLEL TO GW FLOW (m) 2.50E+02
WIDTH OF SOURCE PERPENDICULAR TO GW FLOW (m) 1.03E+02
```

|  |          |
|--|----------|
| THICKNESS OF SOURCE (m)                        | 3.00E+00 |
| PERCOLATION RATE (darcy vel m/y)               | 1.00E-01 |
| VOLUMETRIC WATER CONTENT IN SOURCE             | 3.40E-01 |
| VOLUMETRIC WATER CONTENT IN UNSATURATED ZONE   | 3.40E-01 |
| BULK DENSITY AT SOURCE (g/cm**3)               | 1.50E+00 |
| SORPTION COEFFICIENT AT SOURCE (ml/g)          | 1.65E+04 |
| BULK DENSITY IN UNSAT ZONE (g/cm**3)           | 1.50E+00 |
| UNSATURATED ZONE THICKNESS (m)                 | 1.60E+01 |
| SORPTION COEFFICIENT IN UNSAT ZONE (ml/g)      | 1.65E+04 |
| OPTIONAL LOSS RATE CONSTANT FOR SOURCE (y**-1) | 0.00E+00 |
| INITIAL MASS OR ACTIVITY (mg or Ci)            | 1.03E+08 |
| MOLECULAR WEIGHT (g/mole)                      | 1.00E+01 |
| SOLUBILITY LIMIT (mg/L)                        | 1.20E-03 |
| HALF-LIFE(S) OF CONTAMINANT AND PROGENY (y)    | 1.00E+38 |
| BULK DENSITY OF AQUIFER (g/cm**3)              | 1.90E+00 |
| POROSITY OF AQUIFER                            | 1.00E-01 |
| SORPTION COEFFICIENT(S) IN AQUIFER (ml/g)      | 0.00E+00 |
| DISPERSIVITY X DIRECTION (m)                   | 9.00E+00 |
| DISPERSIVITY Y DIRECTION (m)                   | 4.00E+00 |
| PORE VELOCITY (m/y)                            | 5.70E+02 |
| WELL SCREEN THICKNESS (m)                      | 1.50E+01 |
| DISTANCE TO RECEPTOR ALONG X AXIS (m)          | 1.25E+02 |
| DISTANCE TO RECEPTOR ALONG Y AXIS (m)          | 0.00E+00 |
| LIMITING CONTAMINANT GW CONCENTRATION (mg/L)   | 1.00E-05 |
| UNITS OF CONTAMINANT                           | mg       |

INPUT DATA FILE CREATED BY: J. Sander DATE 8/22/94

INPUT DATA CHECKED BY: John C. Maynard DATE 8/22/94

#### LIMITING SOIL CONCENTRATION CALCULATION

>>> VALUES CALCULATED IN SOURCE SUBROUTINE

\*\*\*\*\*

|   |            |
|---|------------|
| LEACH RATE CONSTANT (1/y)               | 1.3468E-06 |
| UNSATURATED PORE VELOCITY (m/y)         | 2.9412E-01 |
| DECAY CONSTANT(S) (1/y)                 | 0.0000E+00 |
| RETARDATION FACTOR(S) (SATURATED)       | 1.0000E+00 |
| RETARDATION FACTOR (UNSATURATED)        | 7.2795E+04 |
| SOLUBILITY LIMITED MASS (mg)            | 2.2944E+09 |
| SOLUBILITY LIMITED ACTIVITY (Ci)        | 0.0000E+00 |
| TRANSIT TIME IN UNSAT ZONE (years)      | 3.9601E+06 |
| FRACTION DECAYED DURING UNSAT TRANSPORT | 0.0000E+00 |

>>> EXPOSURE DATA FOR LIMITING SOIL CONCENTRATION

\*\*\*\*\*

|                                 |           |
|---------------------------------|-----------|
| INTEGRATION TIME (years)        | 1         |
| BODY WEIGHT (kg)                | 7.000E+01 |
| AVERAGING TIME (days)           | 2.555E+04 |
| WATER INTAKE RATE (L/d)         | 2.000E+00 |
| EXPOSURE FREQUENCY (days/year)  | 3.500E+02 |
| EXPOSURE DURATION (years)       | 7.000E+01 |
| RADIOLOGICAL DOSE LIMIT (rem/y) | 4.000E-03 |
| CARCINOGENIC RISK CRITERIA      | 1.000E-06 |
| HAZARD QUOTIENT                 | 1.000E+00 |

>>> RESULTS OF CALCULATIONS

\*\*\*\*\*

#### MAXIMUM NON RADIOLOGICAL CONTAMINANT CALCULATION

|  |               |
|--|---------------|
| MAXIMUM CONCENTRATION                  | 1.38E-06 mg/L |
| AVERAGE CONCENTRATION                  | 1.38E-06 mg/L |
| PEAK TIME (y):                         | 3.960056E+06  |
| LIMITING SOIL CONCENTRATION (mg/m**3): | 9.668E+03     |
| LIMITING SOIL CONCENTRATION (mg/kg):   | 6.445E+00     |
| LIMITING INVENTORY IN SOIL (mg):       | 7.468E+08     |
| EXECUTION TIME (seconds)               | 3             |



# CFA Landfill I - benzo(g,h,i)perylene

TIME OF RUN 19:41:24.2

DATE OF RUN 08/05/94

INPUT FILE NAME: benzo-g.inp

OUTPUT FILE NAME: benzo-g.out

## ACKNOWLEDGEMENT OF GOVERNMENT SPONSORSHIP AND LIMITATION OF LIABILITY

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```
*****
*
*   This output was produced by the model:
*
*           GWSCREEN
*   Version Control Copy, Version 2.02
*   A semi-analytical model for the assessment
*   of the groundwater pathway from the leaching
*   of surficial and buried contamination and
*   release of contaminants from percolation ponds
*   10-11-93
*   Arthur S. Rood
*   Idaho National Engineering Laboratory
*   EG&G Idaho Inc.
*   Subsurface and Environmental Modeling Unit
*   PO Box 1625
*   Idaho Falls, Idaho 83415
*****
```

>>> TITLE OF PROJECT:

CFA Landfill I - benzo(g,h,i)perylene

## GAUSSIAN QUADRATURE SOLUTION

### MODEL OPTIONS

IMODE: 4

KFLAG: 1 (0)CONC VS TIME; (1)PEAK CONC AND LIMITING SOIL CONC

IMODEL: 1 (1) SURF OR BURIED SOURCE; (2)POND SOURCE; (3) TABULATED SOURCE FUNCTION

>>> INPUT DATA

```
*****
NUMBER OF RADIOACTIVE PROGENY          0
LENGTH OF SOURCE PARALLEL TO GW FLOW (m)  2.50E+02
WIDTH OF SOURCE PERPENDICULAR TO GW FLOW (m)  1.03E+02
THICKNESS OF SOURCE (m)  3.00E+00
PERCOLATION RATE (darcy vel m/y)  1.00E-01
VOLUMETRIC WATER CONTENT IN SOURCE  3.40E-01
VOLUMETRIC WATER CONTENT IN UNSATURATED ZONE  3.40E-01
BULK DENSITY AT SOURCE (g/cm**3)  1.50E+00
SORPTION COEFFICIENT AT SOURCE (ml/g)  4.80E+03
BULK DENSITY IN UNSAT ZONE (g/cm**3)  1.50E+00
UNSATURATED ZONE THICKNESS (m)  1.60E+01
```

|  |          |
|--|----------|
| SORPTION COEFFICIENT IN UNSAT ZONE (ml/g)      | 4.80E+03 |
| OPTIONAL LOSS RATE CONSTANT FOR SOURCE (y**-1) | 0.00E+00 |
| INITIAL MASS OR ACTIVITY (mg or Ci)            | 1.85E+07 |
| MOLECULAR WEIGHT (g/mole)                      | 1.00E+01 |
| SOLUBILITY LIMIT (mg/L)                        | 7.00E-04 |
| HALF-LIFE(S) OF CONTAMINANT AND PROGENY (y)    | 1.00E+38 |
| BULK DENSITY OF AQUIFER (g/cm**3)              | 1.90E+00 |
| POROSITY OF AQUIFER                            | 1.00E-01 |
| SORPTION COEFFICIENT(S) IN AQUIFER (ml/g)      | 0.00E+00 |
| DISPERSIVITY X DIRECTION (m)                   | 9.00E+00 |
| DISPERSIVITY Y DIRECTION (m)                   | 4.00E+00 |
| PORE VELOCITY (m/y)                            | 5.70E+02 |
| WELL SCREEN THICKNESS (m)                      | 1.50E+01 |
| DISTANCE TO RECEPTOR ALONG X AXIS (m)          | 1.25E+02 |
| DISTANCE TO RECEPTOR ALONG Y AXIS (m)          | 0.00E+00 |
| LIMITING CONTAMINANT GW CONCENTRATION (mg/L)   | 0.00E+00 |
| UNITS OF CONTAMINANT                           | mg       |

INPUT DATA FILE CREATED BY: JSondrup DATE 8/22/94

INPUT DATA CHECKED BY: John C. Mayhew DATE 8/22/94

#### LIMITING SOIL CONCENTRATION CALCULATION

>>> VALUES CALCULATED IN SOURCE SUBROUTINE

\*\*\*\*\*

|   |            |
|---|------------|
| LEACH RATE CONSTANT (1/y)               | 4.6294E-06 |
| UNSATURATED PORE VELOCITY (m/y)         | 2.9412E-01 |
| DECAY CONSTANT(S) (1/y)                 | 0.0000E+00 |
| RETARDATION FACTOR(S) (SATURATED)       | 1.0000E+00 |
| RETARDATION FACTOR (UNSATURATED)        | 2.1177E+04 |
| SOLUBILITY LIMITED MASS (mg)            | 3.8936E+08 |
| SOLUBILITY LIMITED ACTIVITY (Ci)        | 0.0000E+00 |
| TRANSIT TIME IN UNSAT ZONE (years)      | 1.1521E+06 |
| FRACTION DECAYED DURING UNSAT TRANSPORT | 0.0000E+00 |

>>> EXPOSURE DATA FOR LIMITING SOIL CONCENTRATION

\*\*\*\*\*

|                                 |           |
|---------------------------------|-----------|
| INTEGRATION TIME (years)        | 1         |
| BODY WEIGHT (kg)                | 7.000E+01 |
| AVERAGING TIME (days)           | 2.555E+04 |
| WATER INTAKE RATE (L/d)         | 2.000E+00 |
| EXPOSURE FREQUENCY (days/year)  | 3.500E+02 |
| EXPOSURE DURATION (years)       | 7.000E+01 |
| RADIOLOGICAL DOSE LIMIT (rem/y) | 4.000E-03 |
| CARCINOGENIC RISK CRITERIA      | 1.000E-06 |
| HAZARD QUOTIENT                 | 1.000E+00 |

>>> RESULTS OF CALCULATIONS

\*\*\*\*\*

#### MAXIMUM NON RADIOLOGICAL CONTAMINANT CALCULATION

|  |               |
|--|---------------|
| MAXIMUM CONCENTRATION                  | 8.51E-07 mg/L |
| AVERAGE CONCENTRATION                  | 8.51E-07 mg/L |
| PEAK TIME (y):                         | 1.152056E+06  |
| LIMITING SOIL CONCENTRATION (mg/m**3): | 0.000E+00     |
| LIMITING SOIL CONCENTRATION (mg/kg):   | 0.000E+00     |
| LIMITING INVENTORY IN SOIL (mg):       | 0.000E+00     |
| EXECUTION TIME (seconds)               | 3             |

# CFA Landfill I - benzo(b)fluoranthene

TIME OF RUN 19:41:18.6

DATE OF RUN 08/05/94

INPUT FILE NAME: benzo-b.inp

OUTPUT FILE NAME: benzo-b.out

## ACKNOWLEDGEMENT OF GOVERNMENT SPONSORSHIP AND LIMITATION OF LIABILITY

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```
*****
*
*   This output was produced by the model:
*
*   GWSCREEN
*   Version Control Copy, Version 2.02
*   A semi-analytical model for the assessment
*   of the groundwater pathway from the leaching
*   of surficial and buried contamination and
*   release of contaminants from percolation ponds
*   10-11-93
*   Arthur S. Rood
*   Idaho National Engineering Laboratory
*   EG&G Idaho Inc.
*   Subsurface and Environmental Modeling Unit
*   PO Box 1625
*   Idaho Falls, Idaho 83415
*****
```

>>> TITLE OF PROJECT:

CFA Landfill I - benzo(b)fluoranthene

## GAUSSIAN QUADRATURE SOLUTION

### MODEL OPTIONS

IMODE: 4

KFLAG: 1 (0)CONC VS TIME; (1)PEAK CONC AND LIMITING SOIL CONC

IMODEL:1 (1) SURF OR BURIED SOURCE; (2)POND SOURCE; (3) TABULATED SOURCE FUNCTION

>>> INPUT DATA

```
*****
NUMBER OF RADIOACTIVE PROGENY          0
LENGTH OF SOURCE PARALLEL TO GW FLOW (m)  2.50E+02
WIDTH OF SOURCE PERPENDICULAR TO GW FLOW (m)  1.03E+02
THICKNESS OF SOURCE (m)                3.00E+00
PERCOLATION RATE (darcy vel m/y)        1.00E-01
VOLUMETRIC WATER CONTENT IN SOURCE      3.40E-01
VOLUMETRIC WATER CONTENT IN UNSATURATED ZONE  3.40E-01
BULK DENSITY AT SOURCE (g/cm**3)        1.50E+00
SORPTION COEFFICIENT AT SOURCE (ml/g)    1.65E+03
BULK DENSITY IN UNSAT ZONE (g/cm**3)     1.50E+00
UNSATURATED ZONE THICKNESS (m)          1.60E+01
```

|  |          |
|--|----------|
| SORPTION COEFFICIENT IN UNSAT ZONE (ml/g)      | 1.65E+03 |
| OPTIONAL LOSS RATE CONSTANT FOR SOURCE (y**-1) | 0.00E+00 |
| INITIAL MASS OR ACTIVITY (mg or Ci)            | 2.43E+07 |
| MOLECULAR WEIGHT (g/mole)                      | 1.00E+01 |
| SOLUBILITY LIMIT (mg/L)                        | 1.40E-02 |
| HALF-LIFE(S) OF CONTAMINANT AND PROGENY (y)    | 1.00E+38 |
| BULK DENSITY OF AQUIFER (g/cm**3)              | 1.90E+00 |
| POROSITY OF AQUIFER                            | 1.00E-01 |
| SORPTION COEFFICIENT(S) IN AQUIFER (ml/g)      | 0.00E+00 |
| DISPERSIVITY X DIRECTION (m)                   | 9.00E+00 |
| DISPERSIVITY Y DIRECTION (m)                   | 4.00E+00 |
| PORE VELOCITY (m/y)                            | 5.70E+02 |
| WELL SCREEN THICKNESS (m)                      | 1.50E+01 |
| DISTANCE TO RECEPTOR ALONG X AXIS (m)          | 1.25E+02 |
| DISTANCE TO RECEPTOR ALONG Y AXIS (m)          | 0.00E+00 |
| LIMITING CONTAMINANT GW CONCENTRATION (mg/L)   | 1.00E-05 |
| UNITS OF CONTAMINANT                           | mg       |

INPUT DATA FILE CREATED BY: *[Signature]* DATE 8/22/94

INPUT DATA CHECKED BY: *[Signature]* DATE 8/22/94

#### LIMITING SOIL CONCENTRATION CALCULATION

##### >>> VALUES CALCULATED IN SOURCE SUBROUTINE

|   |            |
|---|------------|
| LEACH RATE CONSTANT (1/y)               | 1.3466E-05 |
| UNSATURATED PORE VELOCITY (m/y)         | 2.9412E-01 |
| DECAY CONSTANT(S) (1/y)                 | 0.0000E+00 |
| RETARDATION FACTOR(S) (SATURATED)       | 1.0000E+00 |
| RETARDATION FACTOR (UNSATURATED)        | 7.2804E+03 |
| SOLUBILITY LIMITED MASS (mg)            | 2.6771E+09 |
| SOLUBILITY LIMITED ACTIVITY (Ci)        | 0.0000E+00 |
| TRANSIT TIME IN UNSAT ZONE (years)      | 3.9605E+05 |
| FRACTION DECAYED DURING UNSAT TRANSPORT | 0.0000E+00 |

##### >>> EXPOSURE DATA FOR LIMITING SOIL CONCENTRATION

|                                 |           |
|---------------------------------|-----------|
| INTEGRATION TIME (years)        | 1         |
| BODY WEIGHT (kg)                | 7.000E+01 |
| AVERAGING TIME (days)           | 2.555E+04 |
| WATER INTAKE RATE (L/d)         | 2.000E+00 |
| EXPOSURE FREQUENCY (days/year)  | 3.500E+02 |
| EXPOSURE DURATION (years)       | 7.000E+01 |
| RADIOLOGICAL DOSE LIMIT (rem/y) | 4.000E-03 |
| CARCINOGENIC RISK CRITERIA      | 1.000E-06 |
| HAZARD QUOTIENT                 | 1.000E+00 |

##### >>> RESULTS OF CALCULATIONS

#### MAXIMUM NON RADIOLOGICAL CONTAMINANT CALCULATION

|  |               |
|--|---------------|
| MAXIMUM CONCENTRATION                  | 3.25E-06 mg/L |
| AVERAGE CONCENTRATION                  | 3.25E-06 mg/L |
| PEAK TIME (y):                         | 3.960557E+05  |
| LIMITING SOIL CONCENTRATION (mg/m**3): | 9.669E+02     |
| LIMITING SOIL CONCENTRATION (mg/kg):   | 6.446E-01     |
| LIMITING INVENTORY IN SOIL (mg):       | 7.469E+07     |
| EXECUTION TIME (seconds)               | 3             |

# CFA Landfill I - benzo(k)fluoranthene

TIME OF RUN 19:41:30.3

DATE OF RUN 08/05/94

INPUT FILE NAME: benzo-k.inp

OUTPUT FILE NAME: benzo-k.out

## ACKNOWLEDGEMENT OF GOVERNMENT SPONSORSHIP AND LIMITATION OF LIABILITY

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```
*****
*
*   This output was produced by the model:
*
*           GWSCREEN
*   Version Control Copy, Version 2.02
*   A semi-analytical model for the assessment
*   of the groundwater pathway from the leaching
*   of surficial and buried contamination and
*   release of contaminants from percolation ponds
*           10-11-93
*           Arthur S. Rood
*   Idaho National Engineering Laboratory
*           EG&G Idaho Inc.
*   Subsurface and Environmental Modeling Unit
*           PO Box 1625
*           Idaho Falls, Idaho 83415
*****
```

>>> TITLE OF PROJECT:

CFA Landfill I - benzo(k)fluoranthene

## GAUSSIAN QUADRATURE SOLUTION

### MODEL OPTIONS

IMODE: 4

KFLAG: 1 (0)CONC VS TIME; (1)PEAK CONC AND LIMITING SOIL CONC

IMODEL:1 (1) SURF OR BURIED SOURCE; (2)POND SOURCE; (3) TABULATED SOURCE FUNCTION

>>> INPUT DATA

```
*****
NUMBER OF RADIOACTIVE PROGENY                0
LENGTH OF SOURCE PARALLEL TO GW FLOW (m)     2.50E+02
WIDTH OF SOURCE PERPENDICULAR TO GW FLOW (m)  1.03E+02
THICKNESS OF SOURCE (m)                      3.00E+00
PERCOLATION RATE (darcy vel m/y)             1.00E-01
VOLUMETRIC WATER CONTENT IN SOURCE            3.40E-01
VOLUMETRIC WATER CONTENT IN UNSATURATED ZONE  3.40E-01
BULK DENSITY AT SOURCE (g/cm**3)             1.50E+00
SORPTION COEFFICIENT AT SOURCE (ml/g)         1.65E+03
BULK DENSITY IN UNSAT ZONE (g/cm**3)         1.50E+00
UNSATURATED ZONE THICKNESS (m)               1.60E+01
```

|  |          |
|--|----------|
| SORPTION COEFFICIENT IN UNSAT ZONE (ml/g)      | 1.65E+03 |
| OPTIONAL LOSS RATE CONSTANT FOR SOURCE (y**-1) | 0.00E+00 |
| INITIAL MASS OR ACTIVITY (mg or Ci)            | 2.43E+07 |
| MOLECULAR WEIGHT (g/mole)                      | 1.00E+01 |
| SOLUBILITY LIMIT (mg/L)                        | 4.30E-03 |
| HALF-LIFE(S) OF CONTAMINANT AND PROGENY (y)    | 1.00E+38 |
| BULK DENSITY OF AQUIFER (g/cm**3)              | 1.90E+00 |
| POROSITY OF AQUIFER                            | 1.00E-01 |
| SORPTION COEFFICIENT(S) IN AQUIFER (ml/g)      | 0.00E+00 |
| DISPERSIVITY X DIRECTION (m)                   | 9.00E+00 |
| DISPERSIVITY Y DIRECTION (m)                   | 4.00E+00 |
| PORE VELOCITY (m/y)                            | 5.70E+02 |
| WELL SCREEN THICKNESS (m)                      | 1.50E+01 |
| DISTANCE TO RECEPTOR ALONG X AXIS (m)          | 1.25E+02 |
| DISTANCE TO RECEPTOR ALONG Y AXIS (m)          | 0.00E+00 |
| LIMITING CONTAMINANT GW CONCENTRATION (mg/L)   | 1.00E-05 |
| UNITS OF CONTAMINANT                           | mg       |

INPUT DATA FILE CREATED BY: *J. Sandberg* DATE 8/22/94

INPUT DATA CHECKED BY: *John O. Magnus* DATE 8/22/94

#### LIMITING SOIL CONCENTRATION CALCULATION

##### >>> VALUES CALCULATED IN SOURCE SUBROUTINE

|   |            |
|---|------------|
| LEACH RATE CONSTANT (1/y)               | 1.3466E-05 |
| UNSATURATED PORE VELOCITY (m/y)         | 2.9412E-01 |
| DECAY CONSTANT(S) (1/y)                 | 0.0000E+00 |
| RETARDATION FACTOR(S) (SATURATED)       | 1.0000E+00 |
| RETARDATION FACTOR (UNSATURATED)        | 7.2804E+03 |
| SOLUBILITY LIMITED MASS (mg)            | 8.2225E+08 |
| SOLUBILITY LIMITED ACTIVITY (Ci)        | 0.0000E+00 |
| TRANSIT TIME IN UNSAT ZONE (years)      | 3.9605E+05 |
| FRACTION DECAYED DURING UNSAT TRANSPORT | 0.0000E+00 |

##### >>> EXPOSURE DATA FOR LIMITING SOIL CONCENTRATION

|                                 |           |
|---------------------------------|-----------|
| INTEGRATION TIME (years)        | 1         |
| BODY WEIGHT (kg)                | 7.000E+01 |
| AVERAGING TIME (days)           | 2.555E+04 |
| WATER INTAKE RATE (L/d)         | 2.000E+00 |
| EXPOSURE FREQUENCY (days/year)  | 3.500E+02 |
| EXPOSURE DURATION (years)       | 7.000E+01 |
| RADIOLOGICAL DOSE LIMIT (rem/y) | 4.000E-03 |
| CARCINOGENIC RISK CRITERIA      | 1.000E-06 |
| HAZARD QUOTIENT                 | 1.000E+00 |

##### >>> RESULTS OF CALCULATIONS

##### MAXIMUM NON RADIOLOGICAL CONTAMINANT CALCULATION

|  |               |
|--|---------------|
| MAXIMUM CONCENTRATION                  | 3.25E-06 mg/L |
| AVERAGE CONCENTRATION                  | 3.25E-06 mg/L |
| PEAK TIME (y):                         | 3.960557E+05  |
| LIMITING SOIL CONCENTRATION (mg/m**3): | 9.669E+02     |
| LIMITING SOIL CONCENTRATION (mg/kg):   | 6.446E-01     |
| LIMITING INVENTORY IN SOIL (mg):       | 7.469E+07     |
| EXECUTION TIME (seconds)               | 3             |

## CFA Landfill I - chrysene

TIME OF RUN 19:41:42.8

DATE OF RUN 08/05/94

INPUT FILE NAME: chrysene.inp

OUTPUT FILE NAME: chrysene.out

### ACKNOWLEDGEMENT OF GOVERNMENT SPONSORSHIP AND LIMITATION OF LIABILITY

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```
*****
*
*   This output was produced by the model:
*
*           GWSCREEN
*   Version Control Copy, Version 2.02
*   A semi-analytical model for the assessment
*   of the groundwater pathway from the leaching
*   of surficial and buried contamination and
*   release of contaminants from percolation ponds
*   10-11-93
*   Arthur S. Rood
*   Idaho National Engineering Laboratory
*   EG&G Idaho Inc.
*   Subsurface and Environmental Modeling Unit
*   PO Box 1625
*   Idaho Falls, Idaho 83415
*****
```

>>> TITLE OF PROJECT:

CFA Landfill I - chrysene

### GAUSSIAN QUADRATURE SOLUTION

#### MODEL OPTIONS

IMODE: 4

KFLAG: 1 (0)CONC VS TIME; (1)PEAK CONC AND LIMITING SOIL CONC

IMODEL:1 (1) SURF OR BURIED SOURCE; (2)POND SOURCE; (3) TABULATED SOURCE FUNCTION

>>> INPUT DATA

```
*****
NUMBER OF RADIOACTIVE PROGENY          0
LENGTH OF SOURCE PARALLEL TO GW FLOW (m)  2.50E+02
WIDTH OF SOURCE PERPENDICULAR TO GW FLOW (m)  1.03E+02
THICKNESS OF SOURCE (m)                3.00E+00
PERCOLATION RATE (darcy vel m/y)        1.00E-01
VOLUMETRIC WATER CONTENT IN SOURCE      3.40E-01
VOLUMETRIC WATER CONTENT IN UNSATURATED ZONE 3.40E-01
BULK DENSITY AT SOURCE (g/cm**3)        1.50E+00
SORPTION COEFFICIENT AT SOURCE (ml/g)    6.00E+02
BULK DENSITY IN UNSAT ZONE (g/cm**3)    1.50E+00
UNSATURATED ZONE THICKNESS (m)          1.60E+01
```

|  |          |
|--|----------|
| SORPTION COEFFICIENT IN UNSAT ZONE (m1/g)      | 6.00E+02 |
| OPTIONAL LOSS RATE CONSTANT FOR SOURCE (y**-1) | 0.00E+00 |
| INITIAL MASS OR ACTIVITY (mg or Ci)            | 5.21E+07 |
| MOLECULAR WEIGHT (g/mole)                      | 1.00E+01 |
| SOLUBILITY LIMIT (mg/L)                        | 1.80E-03 |
| HALF-LIFE(S) OF CONTAMINANT AND PROGENY (y)    | 1.00E+38 |
| BULK DENSITY OF AQUIFER (g/cm**3)              | 1.90E+00 |
| POROSITY OF AQUIFER                            | 1.00E-01 |
| SORPTION COEFFICIENT(S) IN AQUIFER (m1/g)      | 0.00E+00 |
| DISPERSIVITY X DIRECTION (m)                   | 9.00E+00 |
| DISPERSIVITY Y DIRECTION (m)                   | 4.00E+00 |
| PORE VELOCITY (m/y)                            | 5.70E+02 |
| WELL SCREEN THICKNESS (m)                      | 1.50E+01 |
| DISTANCE TO RECEPTOR ALONG X AXIS (m)          | 1.25E+02 |
| DISTANCE TO RECEPTOR ALONG Y AXIS (m)          | 0.00E+00 |
| LIMITING CONTAMINANT GW CONCENTRATION (mg/L)   | 1.00E-05 |
| UNITS OF CONTAMINANT                           | mg       |

INPUT DATA FILE CREATED BY: *[Signature]* DATE 8/22/94

INPUT DATA CHECKED BY: *[Signature]* DATE 8/22/94

#### LIMITING SOIL CONCENTRATION CALCULATION

>>> VALUES CALCULATED IN SOURCE SUBROUTINE

\*\*\*\*\*

|   |            |
|---|------------|
| LEACH RATE CONSTANT (1/y)               | 3.7023E-05 |
| UNSATURATED PORE VELOCITY (m/y)         | 2.9412E-01 |
| DECAY CONSTANT(S) (1/y)                 | 0.0000E+00 |
| RETARDATION FACTOR(S) (SATURATED)       | 1.0000E+00 |
| RETARDATION FACTOR (UNSATURATED)        | 2.6481E+03 |
| SOLUBILITY LIMITED MASS (mg)            | 1.2519E+08 |
| SOLUBILITY LIMITED ACTIVITY (Ci)        | 0.0000E+00 |
| TRANSIT TIME IN UNSAT ZONE (years)      | 1.4405E+05 |
| FRACTION DECAYED DURING UNSAT TRANSPORT | 0.0000E+00 |

>>> EXPOSURE DATA FOR LIMITING SOIL CONCENTRATION

\*\*\*\*\*

|                                 |           |
|---------------------------------|-----------|
| INTEGRATION TIME (years)        | 1         |
| BODY WEIGHT (kg)                | 7.000E+01 |
| AVERAGING TIME (days)           | 2.555E+04 |
| WATER INTAKE RATE (L/d)         | 2.000E+00 |
| EXPOSURE FREQUENCY (days/year)  | 3.500E+02 |
| EXPOSURE DURATION (years)       | 7.000E+01 |
| RADIOLOGICAL DOSE LIMIT (rem/y) | 4.000E-03 |
| CARCINOGENIC RISK CRITERIA      | 1.000E-06 |
| HAZARD QUOTIENT                 | 1.000E+00 |

>>> RESULTS OF CALCULATIONS

\*\*\*\*\*

#### MAXIMUM NON RADIOLOGICAL CONTAMINANT CALCULATION

|  |               |
|--|---------------|
| MAXIMUM CONCENTRATION                  | 1.92E-05 mg/L |
| AVERAGE CONCENTRATION                  | 1.92E-05 mg/L |
| PEAK TIME (y):                         | 1.440557E+05  |
| LIMITING SOIL CONCENTRATION (mg/m**3): | 3.517E+02     |
| LIMITING SOIL CONCENTRATION (mg/kg):   | 2.345E-01     |
| LIMITING INVENTORY IN SOIL (mg):       | 2.717E+07     |
| EXECUTION TIME (seconds)               | 3             |



## CFA Landfill I - fluoranthene

TIME OF RUN 19:41:48.9  
DATE OF RUN 08/05/94  
INPUT FILE NAME: fluorant.inp  
OUTPUT FILE NAME: fluorant.out

### ACKNOWLEDGEMENT OF GOVERNMENT SPONSORSHIP AND LIMITATION OF LIABILITY

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```
*****
*                                     *
*   This output was produced by the model:   *
*                                     *
*               GWSCREEN               *
*   Version Control Copy, Version 2.02   *
*   A semi-analytical model for the assessment *
*   of the groundwater pathway from the leaching *
*   of surficial and buried contamination and *
*   release of contaminants from percolation ponds *
*   10-11-93                             *
*   Arthur S. Rood                         *
*   Idaho National Engineering Laboratory *
*   EG&G Idaho Inc.                       *
*   Subsurface and Environmental Modeling Unit *
*   PO. Box 1625                           *
*   Idaho Falls, Idaho 83415              *
*****
```

>>> TITLE OF PROJECT:  
CFA Landfill I - fluoranthene

### GAUSSIAN QUADRATURE SOLUTION

#### MODEL OPTIONS

IMODE: 4

KFLAG: 1 (0)CONC VS TIME; (1)PEAK CONC AND LIMITING SOIL CONC

IMODEL:1 (1) SURF OR BURIED SOURCE; (2)POND SOURCE; (3) TABULATED SOURCE FUNCTION

#### >>> INPUT DATA

```
*****
NUMBER OF RADIOACTIVE PROGENY          0
LENGTH OF SOURCE PARALLEL TO GW FLOW (m)  2.50E+02
WIDTH OF SOURCE PERPENDICULAR TO GW FLOW (m)  1.03E+02
THICKNESS OF SOURCE (m)                3.00E+00
PERCOLATION RATE (darcy vel m/y)        1.00E-01
VOLUMETRIC WATER CONTENT IN SOURCE      3.40E-01
VOLUMETRIC WATER CONTENT IN UNSATURATED ZONE  3.40E-01
BULK DENSITY AT SOURCE (g/cm**3)        1.50E+00
SORPTION COEFFICIENT AT SOURCE (ml/g)    1.14E+02
BULK DENSITY IN UNSAT ZONE (g/cm**3)    1.50E+00
UNSATURATED ZONE THICKNESS (m)          1.60E+01
```

|   |          |
|---|----------|
| SORPTION COEFFICIENT IN UNSAT ZONE (ml/g)                   | 1.14E+02 |
| OPTIONAL LOSS RATE CONSTANT FOR SOURCE (y** <sup>-1</sup> ) | 0.00E+00 |
| INITIAL MASS OR ACTIVITY (mg or Ci)                         | 1.16E+07 |
| MOLECULAR WEIGHT (g/mole)                                   | 1.00E+01 |
| SOLUBILITY LIMIT (mg/L)                                     | 2.06E-01 |
| HALF-LIFE(S) OF CONTAMINANT AND PROGENY (y)                 | 1.00E+38 |
| BULK DENSITY OF AQUIFER (g/cm**3)                           | 1.90E+00 |
| POROSITY OF AQUIFER   | 1.00E-01 |
| SORPTION COEFFICIENT(S) IN AQUIFER (ml/g)                   | 0.00E+00 |
| DISPERSIVITY X DIRECTION (m)                                | 9.00E+00 |
| DISPERSIVITY Y DIRECTION (m)                                | 4.00E+00 |
| PORE VELOCITY (m/y)   | 5.70E+02 |
| WELL SCREEN THICKNESS (m)                                   | 1.50E+01 |
| DISTANCE TO RECEPTOR ALONG X AXIS (m)                       | 1.25E+02 |
| DISTANCE TO RECEPTOR ALONG Y AXIS (m)                       | 0.00E+00 |
| LIMITING CONTAMINANT GW CONCENTRATION (mg/L)                | 1.00E+00 |
| UNITS OF CONTAMINANT  | mg       |

INPUT DATA FILE CREATED BY: *J. S. Sandhu* DATE 8/22/94

INPUT DATA CHECKED BY: *John O. Maynard* DATE 8/22/94

#### LIMITING SOIL CONCENTRATION CALCULATION

>>> VALUES CALCULATED IN SOURCE SUBROUTINE

|   |            |
|---|------------|
| LEACH RATE CONSTANT (1/y)               | 1.9454E-04 |
| UNSATURATED PORE VELOCITY (m/y)         | 2.9412E-01 |
| DECAY CONSTANT(S) (1/y)                 | 0.0000E+00 |
| RETARDATION FACTOR(S) (SATURATED)       | 1.0000E+00 |
| RETARDATION FACTOR (UNSATURATED)        | 5.0394E+02 |
| SOLUBILITY LIMITED MASS (mg)            | 2.7266E+09 |
| SOLUBILITY LIMITED ACTIVITY (Ci)        | 0.0000E+00 |
| TRANSIT TIME IN UNSAT ZONE (years)      | 2.7414E+04 |
| FRACTION DECAYED DURING UNSAT TRANSPORT | 0.0000E+00 |

>>> EXPOSURE DATA FOR LIMITING SOIL CONCENTRATION

|                                 |           |
|---------------------------------|-----------|
| INTEGRATION TIME (years)        | 1         |
| BODY WEIGHT (kg)                | 7.000E+01 |
| AVERAGING TIME (days)           | 2.555E+04 |
| WATER INTAKE RATE (L/d)         | 2.000E+00 |
| EXPOSURE FREQUENCY (days/year)  | 3.500E+02 |
| EXPOSURE DURATION (years)       | 7.000E+01 |
| RADIOLOGICAL DOSE LIMIT (rem/y) | 4.000E-03 |
| CARCINOGENIC RISK CRITERIA      | 1.000E-06 |
| HAZARD QUOTIENT                 | 1.000E+00 |

>>> RESULTS OF CALCULATIONS

\*\*\*\*\*

#### MAXIMUM NON RADIOLOGICAL CONTAMINANT CALCULATION

|  |               |
|--|---------------|
| MAXIMUM CONCENTRATION                                      | 2.24E-05 mg/L |
| AVERAGE CONCENTRATION                                      | 2.24E-05 mg/L |
| PEAK TIME (y):   | 2.741565E+04  |
| LIMITING SOIL CONCENTRATION (mg/m**3):                     | 6.694E+06     |
| LIMITING SOIL CONCENTRATION (mg/kg):                       | 4.463E+03     |
| LIMITING INVENTORY IN SOIL (mg):                           | 5.171E+11     |
| WARNING !!! THE LIMITING SOIL MASS OF 5.171E+11 mg         |               |
| EXCEEDS THE SOLUBILITY LIMITED SOURCE MASS OF 2.727E+09 mg |               |
| EXECUTION TIME (seconds)                                   | 3             |

## CFA Landfill I - napthalene

TIME OF RUN 19:42:01.2

DATE OF RUN 08/05/94

INPUT FILE NAME: naphale.inp

OUTPUT FILE NAME: naphale.out

### ACKNOWLEDGEMENT OF GOVERNMENT SPONSORSHIP AND LIMITATION OF LIABILITY

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```
*****
*                                     *
*   This output was produced by the model:   *
*                                     *
*               GWSCREEN               *
*   Version Control Copy, Version 2.02   *
*   A semi-analytical model for the assessment *
*   of the groundwater pathway from the leaching *
*   of surficial and buried contamination and *
*   release of contaminants from percolation ponds *
*   10-11-93                             *
*   Arthur S. Rood                         *
*   Idaho National Engineering Laboratory   *
*   EG&G Idaho Inc.                       *
*   Subsurface and Environmental Modeling Unit *
*   PO Box 1625                           *
*   Idaho Falls, Idaho 83415              *
*****
```

>>> TITLE OF PROJECT:

CFA Landfill I - napthalene

### GAUSSIAN QUADRATURE SOLUTION

#### MODEL OPTIONS

IMODE: 4

KFLAG: 1 (0)CONC VS TIME; (1)PEAK CONC AND LIMITING SOIL CONC

IMODEL:1 (1) SURF OR BURIED SOURCE; (2)POND SOURCE; (3) TABULATED SOURCE FUNCTION

>>> INPUT DATA

```
*****
NUMBER OF RADIOACTIVE PROGENY          0
LENGTH OF SOURCE PARALLEL TO GW FLOW (m)  2.50E+02
WIDTH OF SOURCE PERPENDICULAR TO GW FLOW (m)  1.03E+02
THICKNESS OF SOURCE (m)                 3.00E+00
PERCOLATION RATE (darcy vel m/y)        1.00E-01
VOLUMETRIC WATER CONTENT IN SOURCE      3.40E-01
VOLUMETRIC WATER CONTENT IN UNSATURATED ZONE  3.40E-01
BULK DENSITY AT SOURCE (g/cm**3)        1.50E+00
SORPTION COEFFICIENT AT SOURCE (ml/g)    3.90E+00
BULK DENSITY IN UNSAT ZONE (g/cm**3)     1.50E+00
UNSATURATED ZONE THICKNESS (m)          1.60E+01
```

|   |          |
|---|----------|
| SORPTION COEFFICIENT IN UNSAT ZONE (ml/g)                   | 3.90E+00 |
| OPTIONAL LOSS RATE CONSTANT FOR SOURCE (y** <sup>-1</sup> ) | 0.00E+00 |
| INITIAL MASS OR ACTIVITY (mg or Ci)                         | 4.40E+06 |
| MOLECULAR WEIGHT (g/mole)                                   | 1.00E+01 |
| SOLUBILITY LIMIT (mg/L)                                     | 3.17E+01 |
| HALF-LIFE(S) OF CONTAMINANT AND PROGENY (y)                 | 1.00E+38 |
| BULK DENSITY OF AQUIFER (g/cm**3)                           | 1.90E+00 |
| POROSITY OF AQUIFER   | 1.00E-01 |
| SORPTION COEFFICIENT(S) IN AQUIFER (ml/g)                   | 0.00E+00 |
| DISPERSIVITY X DIRECTION (m)                                | 9.00E+00 |
| DISPERSIVITY Y DIRECTION (m)                                | 4.00E+00 |
| PORE VELOCITY (m/y)   | 5.70E+02 |
| WELL SCREEN THICKNESS (m)                                   | 1.50E+01 |
| DISTANCE TO RECEPTOR ALONG X AXIS (m)                       | 1.25E+02 |
| DISTANCE TO RECEPTOR ALONG Y AXIS (m)                       | 0.00E+00 |
| LIMITING CONTAMINANT GW CONCENTRATION (mg/L)                | 1.00E+00 |
| UNITS OF CONTAMINANT  | mg       |

INPUT DATA FILE CREATED BY: A. Soudkamp DATE 8/22/94

INPUT DATA CHECKED BY: John O. Magnus DATE 8/22/94

#### ----- LIMITING SOIL CONCENTRATION CALCULATION

>>> VALUES CALCULATED IN SOURCE SUBROUTINE

\*\*\*\*\*

|   |            |
|---|------------|
| LEACH RATE CONSTANT (1/y)               | 5.3850E-03 |
| UNSATURATED PORE VELOCITY (m/y)         | 2.9412E-01 |
| DECAY CONSTANT(S) (1/y)                 | 0.0000E+00 |
| RETARDATION FACTOR(S) (SATURATED)       | 1.0000E+00 |
| RETARDATION FACTOR (UNSATURATED)        | 1.8206E+01 |
| SOLUBILITY LIMITED MASS (mg)            | 1.5158E+10 |
| SOLUBILITY LIMITED ACTIVITY (Ci)        | 0.0000E+00 |
| TRANSIT TIME IN UNSAT ZONE (years)      | 9.9040E+02 |
| FRACTION DECAYED DURING UNSAT TRANSPORT | 0.0000E+00 |

>>> EXPOSURE DATA FOR LIMITING SOIL CONCENTRATION

\*\*\*\*\*

|                                 |           |
|---------------------------------|-----------|
| INTEGRATION TIME (years)        | 1         |
| BODY WEIGHT (kg)                | 7.000E+01 |
| AVERAGING TIME (days)           | 2.555E+04 |
| WATER INTAKE RATE (L/d)         | 2.000E+00 |
| EXPOSURE FREQUENCY (days/year)  | 3.500E+02 |
| EXPOSURE DURATION (years)       | 7.000E+01 |
| RADIOLOGICAL DOSE LIMIT (rem/y) | 4.000E-03 |
| CARCINOGENIC RISK CRITERIA      | 1.000E-06 |
| HAZARD QUOTIENT                 | 1.000E+00 |

>>> RESULTS OF CALCULATIONS

\*\*\*\*\*

#### MAXIMUM NON RADIOLOGICAL CONTAMINANT CALCULATION

|  |               |
|--|---------------|
| MAXIMUM CONCENTRATION                                      | 2.35E-04 mg/L |
| AVERAGE CONCENTRATION                                      | 2.35E-04 mg/L |
| PEAK TIME (y):   | 9.912919E+02  |
| LIMITING SOIL CONCENTRATION (mg/m**3):                     | 2.427E+05     |
| LIMITING SOIL CONCENTRATION (mg/kg):                       | 1.618E+02     |
| LIMITING INVENTORY IN SOIL (mg):                           | 1.875E+10     |
| WARNING !!! THE LIMITING SOIL MASS OF 1.875E+10 mg         |               |
| EXCEEDS THE SOLUBILITY LIMITED SOURCE MASS OF 1.516E+10 mg |               |
| EXECUTION TIME (seconds)                                   | 3             |

## CFA Landfill I - phenanthrene

TIME OF RUN 19:42:07.5  
DATE OF RUN 08/05/94  
INPUT FILE NAME: phenanth.inp  
OUTPUT FILE NAME: phenanth.out

### =====

#### ACKNOWLEDGEMENT OF GOVERNMENT SPONSORSHIP AND LIMITATION OF LIABILITY

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=====

```
*****
*
*   This output was produced by the model:
*
*           GWSCREEN
*   Version Control Copy, Version 2.02
*   A semi-analytical model for the assessment
*   of the groundwater pathway from the leaching
*   of surficial and buried contamination and
*   release of contaminants from percolation ponds
*           10-11-93
*           Arthur S. Rood
*   Idaho National Engineering Laboratory
*           EG&G Idaho Inc.
*   Subsurface and Environmental Modeling Unit
*           PO Box 1625
*           Idaho Falls, Idaho 83415
*****
```

>>> TITLE OF PROJECT:  
CFA Landfill I - phenanthrene

#### =====

#### GAUSSIAN QUADRATURE SOLUTION

##### MODEL OPTIONS

IMODE: 4

KFLAG: 1 (0)CONC VS TIME; (1)PEAK CONC AND LIMITING SOIL CONC

IMODEL:1 (1) SURF OR BURIED SOURCE; (2)POND SOURCE; (3) TABULATED SOURCE FUNCTION

##### >>> INPUT DATA

```
*****
NUMBER OF RADIOACTIVE PROGENY          0
LENGTH OF SOURCE PARALLEL TO GW FLOW (m)  2.50E+02
WIDTH OF SOURCE PERPENDICULAR TO GW FLOW (m)  1.03E+02
THICKNESS OF SOURCE (m)                3.00E+00
PERCOLATION RATE (darcy vel m/y)        1.00E-01
VOLUMETRIC WATER CONTENT IN SOURCE      3.40E-01
VOLUMETRIC WATER CONTENT IN UNSATURATED ZONE  3.40E-01
BULK DENSITY AT SOURCE (g/cm**3)        1.50E+00
SORPTION COEFFICIENT AT SOURCE (ml/g)    4.20E+01
BULK DENSITY IN UNSAT ZONE (g/cm**3)     1.50E+00
UNSATURATED ZONE THICKNESS (m)          1.60E+01
```

|  |          |
|--|----------|
| SORPTION COEFFICIENT IN UNSAT ZONE (ml/g)      | 4.20E+01 |
| OPTIONAL LOSS RATE CONSTANT FOR SOURCE (y**-1) | 0.00E+00 |
| INITIAL MASS OR ACTIVITY (mg or Ci)            | 6.37E+06 |
| MOLECULAR WEIGHT (g/mole)                      | 1.00E+01 |
| SOLUBILITY LIMIT (mg/L)                        | 1.00E+00 |
| HALF-LIFE(S) OF CONTAMINANT AND PROGENY (y)    | 1.00E+38 |
| BULK DENSITY OF AQUIFER (g/cm**3)              | 1.90E+00 |
| POROSITY OF AQUIFER                            | 1.00E-01 |
| SORPTION COEFFICIENT(S) IN AQUIFER (ml/g)      | 0.00E+00 |
| DISPERSIVITY X DIRECTION (m)                   | 9.00E+00 |
| DISPERSIVITY Y DIRECTION (m)                   | 4.00E+00 |
| PORE VELOCITY (m/y)                            | 5.70E+02 |
| WELL SCREEN THICKNESS (m)                      | 1.50E+01 |
| DISTANCE TO RECEPTOR ALONG X AXIS (m)          | 1.25E+02 |
| DISTANCE TO RECEPTOR ALONG Y AXIS (m)          | 0.00E+00 |
| LIMITING CONTAMINANT GW CONCENTRATION (mg/L)   | 0.00E+00 |
| UNITS OF CONTAMINANT                           | mg       |

INPUT DATA FILE CREATED BY: JS Sandberg DATE 8/22/94

INPUT DATA CHECKED BY: Jim O. Magnus DATE 8/22/94

#### LIMITING SOIL CONCENTRATION CALCULATION

>>> VALUES CALCULATED IN SOURCE SUBROUTINE

\*\*\*\*\*

|   |            |
|---|------------|
| LEACH RATE CONSTANT (1/y)               | 5.2626E-04 |
| UNSATURATED PORE VELOCITY (m/y)         | 2.9412E-01 |
| DECAY CONSTANT(S) (1/y)                 | 0.0000E+00 |
| RETARDATION FACTOR(S) (SATURATED)       | 1.0000E+00 |
| RETARDATION FACTOR (UNSATURATED)        | 1.8629E+02 |
| SOLUBILITY LIMITED MASS (mg)            | 4.8930E+09 |
| SOLUBILITY LIMITED ACTIVITY (Ci)        | 0.0000E+00 |
| TRANSIT TIME IN UNSAT ZONE (years)      | 1.0134E+04 |
| FRACTION DECAYED DURING UNSAT TRANSPORT | 0.0000E+00 |

>>> EXPOSURE DATA FOR LIMITING SOIL CONCENTRATION

\*\*\*\*\*

|                                 |           |
|---------------------------------|-----------|
| INTEGRATION TIME (years)        | 1         |
| BODY WEIGHT (kg)                | 7.000E+01 |
| AVERAGING TIME (days)           | 2.555E+04 |
| WATER INTAKE RATE (L/d)         | 2.000E+00 |
| EXPOSURE FREQUENCY (days/year)  | 3.500E+02 |
| EXPOSURE DURATION (years)       | 7.000E+01 |
| RADIOLOGICAL DOSE LIMIT (rem/y) | 4.000E-03 |
| CARCINOGENIC RISK CRITERIA      | 1.000E-06 |
| HAZARD QUOTIENT                 | 1.000E+00 |

>>> RESULTS OF CALCULATIONS

\*\*\*\*\*

#### MAXIMUM NON RADIOLOGICAL CONTAMINANT CALCULATION

|  |               |
|--|---------------|
| MAXIMUM CONCENTRATION                  | 3.33E-05 mg/L |
| AVERAGE CONCENTRATION                  | 3.33E-05 mg/L |
| PEAK TIME (y):                         | 1.013541E+04  |
| LIMITING SOIL CONCENTRATION (mg/m**3): | 0.000E+00     |
| LIMITING SOIL CONCENTRATION (mg/kg):   | 0.000E+00     |
| LIMITING INVENTORY IN SOIL (mg):       | 0.000E+00     |
| EXECUTION TIME (seconds)               | 3             |

## CFA Landfill I - pyrene

TIME OF RUN 19:42:13.9

DATE OF RUN 08/05/94

INPUT FILE NAME: pyrene.inp

OUTPUT FILE NAME: pyrene.out

=====

### ACKNOWLEDGEMENT OF GOVERNMENT SPONSORSHIP AND LIMITATION OF LIABILITY

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=====

\*\*\*\*\*

|  |   |
|--|---|
| *  | * |
| * This output was produced by the model:         | * |
| *  | * |
| * GWSCREEN                                       | * |
| * Version Control Copy, Version 2.02             | * |
| * A semi-analytical model for the assessment     | * |
| * of the groundwater pathway from the leaching   | * |
| * of surficial and buried contamination and      | * |
| * release of contaminants from percolation ponds | * |
| * 10-11-93                                       | * |
| * Arthur S. Rood                                 | * |
| * Idaho National Engineering Laboratory          | * |
| * EG&G Idaho Inc.                                | * |
| * Subsurface and Environmental Modeling Unit     | * |
| * PO Box 1625                                    | * |
| * Idaho Falls, Idaho 83415                       | * |

\*\*\*\*\*

>>> TITLE OF PROJECT:  
CFA Landfill I - pyrene

-----

### GAUSSIAN QUADRATURE SOLUTION

#### MODEL OPTIONS

IMODE: 4

KFLAG: 1 (0)CONC VS TIME; (1)PEAK CONC AND LIMITING SOIL CONC

IMODEL:1 (1) SURF OR BURIED SOURCE; (2)POND SOURCE; (3) TABULATED SOURCE FUNCTION

#### >>> INPUT DATA

\*\*\*\*\*

|  |          |
|--|----------|
| NUMBER OF RADIOACTIVE PROGENY                | 0        |
| LENGTH OF SOURCE PARALLEL TO GW FLOW (m)     | 2.50E+02 |
| WIDTH OF SOURCE PERPENDICULAR TO GW FLOW (m) | 1.03E+02 |
| THICKNESS OF SOURCE (m)                      | 3.00E+00 |
| PERCOLATION RATE (darcy vel m/y)             | 1.00E-01 |
| VOLUMETRIC WATER CONTENT IN SOURCE           | 3.40E-01 |
| VOLUMETRIC WATER CONTENT IN UNSATURATED ZONE | 3.40E-01 |
| BULK DENSITY AT SOURCE (g/cm**3)             | 1.50E+00 |
| SORPTION COEFFICIENT AT SOURCE (ml/g)        | 1.14E+02 |
| BULK DENSITY IN UNSAT ZONE (g/cm**3)         | 1.50E+00 |
| UNSATURATED ZONE THICKNESS (m)               | 1.60E+01 |

|  |          |
|--|----------|
| SORPTION COEFFICIENT IN UNSAT ZONE (ml/g)      | 1.14E+02 |
| OPTIONAL LOSS RATE CONSTANT FOR SOURCE (y**-1) | 0.00E+00 |
| INITIAL MASS OR ACTIVITY (mg or Ci)            | 5.10E+07 |
| MOLECULAR WEIGHT (g/mole)                      | 1.00E+01 |
| SOLUBILITY LIMIT (mg/L)                        | 1.32E-01 |
| HALF-LIFE(S) OF CONTAMINANT AND PROGENY (y)    | 1.00E+38 |
| BULK DENSITY OF AQUIFER (g/cm**3)              | 1.90E+00 |
| POROSITY OF AQUIFER                            | 1.00E-01 |
| SORPTION COEFFICIENT(S) IN AQUIFER (ml/g)      | 0.00E+00 |
| DISPERSIVITY X DIRECTION (m)                   | 9.00E+00 |
| DISPERSIVITY Y DIRECTION (m)                   | 4.00E+00 |
| PORE VELOCITY (m/y)                            | 5.70E+02 |
| WELL SCREEN THICKNESS (m)                      | 1.50E+01 |
| DISTANCE TO RECEPTOR ALONG X AXIS (m)          | 1.25E+02 |
| DISTANCE TO RECEPTOR ALONG Y AXIS (m)          | 0.00E+00 |
| LIMITING CONTAMINANT GW CONCENTRATION (mg/L)   | 1.00E+00 |
| UNITS OF CONTAMINANT                           | mg       |

INPUT DATA FILE CREATED BY J. Souder DATE 8/22/94

INPUT DATA CHECKED BY: John A. Magnus DATE 8/22/94

#### LIMITING SOIL CONCENTRATION CALCULATION

>>> VALUES CALCULATED IN SOURCE SUBROUTINE

|   |            |
|---|------------|
| LEACH RATE CONSTANT (1/y)               | 1.9454E-04 |
| UNSATURATED PORE VELOCITY (m/y)         | 2.9412E-01 |
| DECAY CONSTANT(S) (1/y)                 | 0.0000E+00 |
| RETARDATION FACTOR(S) (SATURATED)       | 1.0000E+00 |
| RETARDATION FACTOR (UNSATURATED)        | 5.0394E+02 |
| SOLUBILITY LIMITED MASS (mg)            | 1.7472E+09 |
| SOLUBILITY LIMITED ACTIVITY (Ci)        | 0.0000E+00 |
| TRANSIT TIME IN UNSAT ZONE (years)      | 2.7414E+04 |
| FRACTION DECAYED DURING UNSAT TRANSPORT | 0.0000E+00 |

>>> EXPOSURE DATA FOR LIMITING SOIL CONCENTRATION

|                                 |           |
|---------------------------------|-----------|
| INTEGRATION TIME (years)        | 1         |
| BODY WEIGHT (kg)                | 7.000E+01 |
| AVERAGING TIME (days)           | 2.555E+04 |
| WATER INTAKE RATE (L/d)         | 2.000E+00 |
| EXPOSURE FREQUENCY (days/year)  | 3.500E+02 |
| EXPOSURE DURATION (years)       | 7.000E+01 |
| RADIOLOGICAL DOSE LIMIT (rem/y) | 4.000E-03 |
| CARCINOGENIC RISK CRITERIA      | 1.000E-06 |
| HAZARD QUOTIENT                 | 1.000E+00 |

>>> RESULTS OF CALCULATIONS

#### MAXIMUM NON RADIOLOGICAL CONTAMINANT CALCULATION

|  |               |
|--|---------------|
| MAXIMUM CONCENTRATION                                      | 9.86E-05 mg/L |
| AVERAGE CONCENTRATION                                      | 9.86E-05 mg/L |
| PEAK TIME (y):   | 2.741565E+04  |
| LIMITING SOIL CONCENTRATION (mg/m**3):                     | 6.694E+06     |
| LIMITING SOIL CONCENTRATION (mg/kg):                       | 4.463E+03     |
| LIMITING INVENTORY IN SOIL (mg):                           | 5.171E+11     |
| WARNING !!! THE LIMITING SOIL MASS OF 5.171E+11 mg         |               |
| EXCEEDS THE SOLUBILITY LIMITED SOURCE MASS OF 1.747E+09 mg |               |
| EXECUTION TIME (seconds)                                   | 3             |



## CFA Landfill I - chromium

TIME OF RUN 19:41:36.5  
DATE OF RUN 08/05/94  
INPUT FILE NAME: chromium.inp  
OUTPUT FILE NAME: chromium.out

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```
*****
*                                     *
*   This output was produced by the model:   *
*                                     *
*               GWSCREEN                 *
*   Version Control Copy, Version 2.02       *
*   A semi-analytical model for the assessment *
*   of the groundwater pathway from the leaching *
*   of surficial and buried contamination and *
*   release of contaminants from percolation ponds *
*   10-11-93                               *
*   Arthur S. Rood                           *
*   Idaho National Engineering Laboratory     *
*   EG&G Idaho Inc.                         *
*   Subsurface and Environmental Modeling Unit *
*   PO Box 1625                             *
*   Idaho Falls, Idaho 83415                *
*****
```

>>> TITLE OF PROJECT:  
CFA Landfill I - chromium

### GAUSSIAN QUADRATURE SOLUTION

#### MODEL OPTIONS

IMODE: 4

KFLAG: 1 (0)CONC VS TIME; (1)PEAK CONC AND LIMITING SOIL CONC

IMODEL: 1 (1) SURF OR BURIED SOURCE; (2)POND SOURCE; (3) TABULATED SOURCE FUNCTION

#### >>> INPUT DATA

```
*****
NUMBER OF RADIOACTIVE PROGENY                0
LENGTH OF SOURCE PARALLEL TO GW FLOW (m)    2.50E+02
WIDTH OF SOURCE PERPENDICULAR TO GW FLOW (m) 1.03E+02
THICKNESS OF SOURCE (m)                     3.00E+00
PERCOLATION RATE (darcy vel m/y)            1.00E-01
VOLUMETRIC WATER CONTENT IN SOURCE          3.40E-01
VOLUMETRIC WATER CONTENT IN UNSATURATED ZONE 3.40E-01
BULK DENSITY AT SOURCE (g/cm**3)            1.50E+00
SORPTION COEFFICIENT AT SOURCE (ml/g)        1.20E+00
BULK DENSITY IN UNSAT ZONE (g/cm**3)         1.50E+00
UNSATURATED ZONE THICKNESS (m)              1.60E+01
```

|   |          |
|---|----------|
| SORPTION COEFFICIENT IN UNSAT ZONE (ml/g)                   | 1.20E+00 |
| OPTIONAL LOSS RATE CONSTANT FOR SOURCE (y** <sup>-1</sup> ) | 0.00E+00 |
| INITIAL MASS OR ACTIVITY (mg or Ci)                         | 6.06E+09 |
| MOLECULAR WEIGHT (g/mole)                                   | 1.00E+01 |
| SOLUBILITY LIMIT (mg/L)                                     | 4.40E+05 |
| HALF-LIFE(S) OF CONTAMINANT AND PROGENY (y)                 | 1.00E+38 |
| BULK DENSITY OF AQUIFER (g/cm**3)                           | 1.90E+00 |
| POROSITY OF AQUIFER   | 1.00E-01 |
| SORPTION COEFFICIENT(S) IN AQUIFER (ml/g)                   | 0.00E+00 |
| DISPERSIVITY X DIRECTION (m)                                | 9.00E+00 |
| DISPERSIVITY Y DIRECTION (m)                                | 4.00E+00 |
| PORE VELOCITY (m/y)   | 5.70E+02 |
| WELL SCREEN THICKNESS (m)                                   | 1.50E+01 |
| DISTANCE TO RECEPTOR ALONG X AXIS (m)                       | 1.25E+02 |
| DISTANCE TO RECEPTOR ALONG Y AXIS (m)                       | 0.00E+00 |
| LIMITING CONTAMINANT GW CONCENTRATION (mg/L)                | 4.00E+01 |
| UNITS OF CONTAMINANT  | mg       |

INPUT DATA FILE CREATED BY: Sondrup DATE 8/22/94

INPUT DATA CHECKED BY: Juan O. Mayman DATE 8/22/94

#### LIMITING SOIL CONCENTRATION CALCULATION

>>> VALUES CALCULATED IN SOURCE SUBROUTINE

\*\*\*\*\*

|   |            |
|---|------------|
| LEACH RATE CONSTANT (1/y)               | 1.5576E-02 |
| UNSATURATED PORE VELOCITY (m/y)         | 2.9412E-01 |
| DECAY CONSTANT(S) (1/y)                 | 0.0000E+00 |
| RETARDATION FACTOR(S) (SATURATED)       | 1.0000E+00 |
| RETARDATION FACTOR (UNSATURATED)        | 6.2941E+00 |
| SOLUBILITY LIMITED MASS (mg)            | 7.2739E+13 |
| SOLUBILITY LIMITED ACTIVITY (Ci)        | 0.0000E+00 |
| TRANSIT TIME IN UNSAT ZONE (years)      | 3.4240E+02 |
| FRACTION DECAYED DURING UNSAT TRANSPORT | 0.0000E+00 |

>>> EXPOSURE DATA FOR LIMITING SOIL CONCENTRATION

\*\*\*\*\*

|                                 |           |
|---------------------------------|-----------|
| INTEGRATION TIME (years)        | 1         |
| BODY WEIGHT (kg)                | 7.000E+01 |
| AVERAGING TIME (days)           | 2.555E+04 |
| WATER INTAKE RATE (L/d)         | 2.000E+00 |
| EXPOSURE FREQUENCY (days/year)  | 3.500E+02 |
| EXPOSURE DURATION (years)       | 7.000E+01 |
| RADIOLOGICAL DOSE LIMIT (rem/y) | 4.000E-03 |
| CARCINOGENIC RISK CRITERIA      | 1.000E-06 |
| HAZARD QUOTIENT                 | 1.000E+00 |

>>> RESULTS OF CALCULATIONS

\*\*\*\*\*

#### MAXIMUM NON RADIOLOGICAL CONTAMINANT CALCULATION

|  |               |
|--|---------------|
| MAXIMUM CONCENTRATION                  | 9.29E-01 mg/L |
| AVERAGE CONCENTRATION                  | 9.29E-01 mg/L |
| PEAK TIME (y):                         | 3.432181E+02  |
| LIMITING SOIL CONCENTRATION (mg/m**3): | 3.378E+06     |
| LIMITING SOIL CONCENTRATION (mg/kg):   | 2.252E+03     |
| LIMITING INVENTORY IN SOIL (mg):       | 2.609E+11     |
| EXECUTION TIME (seconds)               | 3             |

## CFA Landfill I - lead

TIME OF RUN 19:41:55.1  
DATE OF RUN 08/05/94  
INPUT FILE NAME: lead.inp  
OUTPUT FILE NAME: lead.out

### =====

#### ACKNOWLEDGEMENT OF GOVERNMENT SPONSORSHIP AND LIMITATION OF LIABILITY

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=====

\*\*\*\*\*  
\*  
\* This output was produced by the model: \*  
\*  
\* GWSCREEN \*  
\* Version Control Copy, Version 2.02 \*  
\* A semi-analytical model for the assessment \*  
\* of the groundwater pathway from the leaching \*  
\* of surficial and buried contamination and \*  
\* release of contaminants from percolation ponds \*  
\* 10-11-93 \*  
\* Arthur S. Rood \*  
\* Idaho National Engineering Laboratory \*  
\* EG&G Idaho Inc. \*  
\* Subsurface and Environmental Modeling Unit \*  
\* PO Box 1625 \*  
\* Idaho Falls, Idaho 83415 \*  
\*\*\*\*\*

>>> TITLE OF PROJECT:  
CFA Landfill I - lead

#### =====

#### GAUSSIAN QUADRATURE SOLUTION

##### MODEL OPTIONS

IMODE: 4

KFLAG: 1 (0)CONC VS TIME; (1)PEAK CONC AND LIMITING SOIL CONC

IMODEL:1 (1) SURF OR BURIED SOURCE; (2)POND SOURCE; (3) TABULATED SOURCE FUNCTION

##### >>> INPUT DATA

\*\*\*\*\*

|  |          |
|--|----------|
| NUMBER OF RADIOACTIVE PROGENY                | 0        |
| LENGTH OF SOURCE PARALLEL TO GW FLOW (m)     | 2.50E+02 |
| WIDTH OF SOURCE PERPENDICULAR TO GW FLOW (m) | 1.03E+02 |
| THICKNESS OF SOURCE (m)                      | 3.00E+00 |
| PERCOLATION RATE (darcy vel m/y)             | 1.00E-01 |
| VOLUMETRIC WATER CONTENT IN SOURCE           | 3.40E-01 |
| VOLUMETRIC WATER CONTENT IN UNSATURATED ZONE | 3.40E-01 |
| BULK DENSITY AT SOURCE (g/cm**3)             | 1.50E+00 |
| SORPTION COEFFICIENT AT SOURCE (ml/g)        | 1.00E+02 |
| BULK DENSITY IN UNSAT ZONE (g/cm**3)         | 1.50E+00 |
| UNSATURATED ZONE THICKNESS (m)               | 1.60E+01 |

|   |          |
|---|----------|
| SORPTION COEFFICIENT IN UNSAT ZONE (ml/g)                   | 1.00E+02 |
| OPTIONAL LOSS RATE CONSTANT FOR SOURCE (y** <sup>-1</sup> ) | 0.00E+00 |
| INITIAL MASS OR ACTIVITY (mg or Ci)                         | 1.12E+10 |
| MOLECULAR WEIGHT (g/mole)                                   | 1.00E+01 |
| SOLUBILITY LIMIT (mg/L)                                     | 1.25E+02 |
| HALF-LIFE(S) OF CONTAMINANT AND PROGENY (y)                 | 1.00E+38 |
| BULK DENSITY OF AQUIFER (g/cm**3)                           | 1.90E+00 |
| POROSITY OF AQUIFER   | 1.00E-01 |
| SORPTION COEFFICIENT(S) IN AQUIFER (ml/g)                   | 0.00E+00 |
| DISPERSIVITY X DIRECTION (m)                                | 9.00E+00 |
| DISPERSIVITY Y DIRECTION (m)                                | 4.00E+00 |
| PORE VELOCITY (m/y)   | 5.70E+02 |
| WELL SCREEN THICKNESS (m)                                   | 1.50E+01 |
| DISTANCE TO RECEPTOR ALONG X AXIS (m)                       | 1.25E+02 |
| DISTANCE TO RECEPTOR ALONG Y AXIS (m)                       | 0.00E+00 |
| LIMITING CONTAMINANT GW CONCENTRATION (mg/L)                | 0.00E+00 |
| UNITS OF CONTAMINANT  | mg       |

INPUT DATA FILE CREATED BY: Sondrup DATE 8/22/94

INPUT DATA CHECKED BY: John G. Magnus DATE 8/22/94

-----  
LIMITING SOIL CONCENTRATION CALCULATION

>>> VALUES CALCULATED IN SOURCE SUBROUTINE

\*\*\*\*\*

|   |            |
|---|------------|
| LEACH RATE CONSTANT (1/y)               | 2.2172E-04 |
| UNSATURATED PORE VELOCITY (m/y)         | 2.9412E-01 |
| DECAY CONSTANT(S) (1/y)                 | 0.0000E+00 |
| RETARDATION FACTOR(S) (SATURATED)       | 1.0000E+00 |
| RETARDATION FACTOR (UNSATURATED)        | 4.4218E+02 |
| SOLUBILITY LIMITED MASS (mg)            | 1.4517E+12 |
| SOLUBILITY LIMITED ACTIVITY (Ci)        | 0.0000E+00 |
| TRANSIT TIME IN UNSAT ZONE (years)      | 2.4054E+04 |
| FRACTION DECAYED DURING UNSAT TRANSPORT | 0.0000E+00 |

>>> EXPOSURE DATA FOR LIMITING SOIL CONCENTRATION

\*\*\*\*\*

|                                 |           |
|---------------------------------|-----------|
| INTEGRATION TIME (years)        | 1         |
| BODY WEIGHT (kg)                | 7.000E+01 |
| AVERAGING TIME (days)           | 2.555E+04 |
| WATER INTAKE RATE (L/d)         | 2.000E+00 |
| EXPOSURE FREQUENCY (days/year)  | 3.500E+02 |
| EXPOSURE DURATION (years)       | 7.000E+01 |
| RADIOLOGICAL DOSE LIMIT (rem/y) | 4.000E-03 |
| CARCINOGENIC RISK CRITERIA      | 1.000E-06 |
| HAZARD QUOTIENT                 | 1.000E+00 |

>>> RESULTS OF CALCULATIONS

\*\*\*\*\*

MAXIMUM NON RADIOLOGICAL CONTAMINANT CALCULATION

|  |               |
|--|---------------|
| MAXIMUM CONCENTRATION                  | 2.47E-02 mg/L |
| AVERAGE CONCENTRATION                  | 2.47E-02 mg/L |
| PEAK TIME (y):                         | 2.405565E+04  |
| LIMITING SOIL CONCENTRATION (mg/m**3): | 0.000E+00     |
| LIMITING SOIL CONCENTRATION (mg/kg):   | 0.000E+00     |
| LIMITING INVENTORY IN SOIL (mg):       | 0.000E+00     |
| EXECUTION TIME (seconds)               | 3             |

## CFA Landfill I - silver

TIME OF RUN 19:42:20.0

DATE OF RUN 08/05/94

INPUT FILE NAME: silver.inp

OUTPUT FILE NAME: silver.out

### ACKNOWLEDGEMENT OF GOVERNMENT SPONSORSHIP AND LIMITATION OF LIABILITY

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```
*****
*
*   This output was produced by the model:
*
*   GWSCREEN
*   Version Control Copy, Version 2.02
*   A semi-analytical model for the assessment
*   of the groundwater pathway from the leaching
*   of surficial and buried contamination and
*   release of contaminants from percolation ponds
*   10-11-93
*   Arthur S. Rood
*   Idaho National Engineering Laboratory
*   EG&G Idaho Inc.
*   Subsurface and Environmental Modeling Unit
*   PO Box 1625
*   Idaho Falls, Idaho 83415
*****
```

>>> TITLE OF PROJECT:  
CFA Landfill I - silver

### GAUSSIAN QUADRATURE SOLUTION

#### MODEL OPTIONS

IMODE: 4

KFLAG: 1 (0)CONC VS TIME; (1)PEAK CONC AND LIMITING SOIL CONC

IMODEL:1 (1) SURF OR BURIED SOURCE; (2)POND SOURCE; (3) TABULATED SOURCE FUNCTION

#### >>> INPUT DATA

```
*****
NUMBER OF RADIOACTIVE PROGENY          0
LENGTH OF SOURCE PARALLEL TO GW FLOW (m)  2.50E+02
WIDTH OF SOURCE PERPENDICULAR TO GW FLOW (m)  1.03E+02
THICKNESS OF SOURCE (m)                3.00E+00
PERCOLATION RATE (darcy vel m/y)        1.00E-01
VOLUMETRIC WATER CONTENT IN SOURCE      3.40E-01
VOLUMETRIC WATER CONTENT IN UNSATURATED ZONE 3.40E-01
BULK DENSITY AT SOURCE (g/cm**3)        1.50E+00
SORPTION COEFFICIENT AT SOURCE (ml/g)    9.00E+01
BULK DENSITY IN UNSAT ZONE (g/cm**3)     1.50E+00
UNSATURATED ZONE THICKNESS (m)          1.60E+01
```

|   |          |
|---|----------|
| SORPTION COEFFICIENT IN UNSAT ZONE (ml/g)                   | 9.00E+01 |
| OPTIONAL LOSS RATE CONSTANT FOR SOURCE (y** <sup>-1</sup> ) | 0.00E+00 |
| INITIAL MASS OR ACTIVITY (mg or Ci)                         | 2.26E+09 |
| MOLECULAR WEIGHT (g/mole)                                   | 1.00E+01 |
| SOLUBILITY LIMIT (mg/L)                                     | 1.00E+06 |
| HALF-LIFE(S) OF CONTAMINANT AND PROGENY (y)                 | 1.00E+38 |
| BULK DENSITY OF AQUIFER (g/cm**3)                           | 1.90E+00 |
| POROSITY OF AQUIFER   | 1.00E-01 |
| SORPTION COEFFICIENT(S) IN AQUIFER (ml/g)                   | 0.00E+00 |
| DISPERSIVITY X DIRECTION (m)                                | 9.00E+00 |
| DISPERSIVITY Y DIRECTION (m)                                | 4.00E+00 |
| PORE VELOCITY (m/y)   | 5.70E+02 |
| WELL SCREEN THICKNESS (m)                                   | 1.50E+01 |
| DISTANCE TO RECEPTOR ALONG X AXIS (m)                       | 1.25E+02 |
| DISTANCE TO RECEPTOR ALONG Y AXIS (m)                       | 0.00E+00 |
| LIMITING CONTAMINANT GW CONCENTRATION (mg/L)                | 2.00E-01 |
| UNITS OF CONTAMINANT  | mg       |

INPUT DATA FILE CREATED BY: Samuel DATE 8/22/94

INPUT DATA CHECKED BY: John O. Magnus DATE 8/22/94

#### LIMITING SOIL CONCENTRATION CALCULATION

>>> VALUES CALCULATED IN SOURCE SUBROUTINE

\*\*\*\*\*

|   |            |
|---|------------|
| LEACH RATE CONSTANT (1/y)               | 2.4629E-04 |
| UNSATURATED PORE VELOCITY (m/y)         | 2.9412E-01 |
| DECAY CONSTANT(S) (1/y)                 | 0.0000E+00 |
| RETARDATION FACTOR(S) (SATURATED)       | 1.0000E+00 |
| RETARDATION FACTOR (UNSATURATED)        | 3.9806E+02 |
| SOLUBILITY LIMITED MASS (mg)            | 1.0455E+16 |
| SOLUBILITY LIMITED ACTIVITY (Ci)        | 0.0000E+00 |
| TRANSIT TIME IN UNSAT ZONE (years)      | 2.1654E+04 |
| FRACTION DECAYED DURING UNSAT TRANSPORT | 0.0000E+00 |

>>> EXPOSURE DATA FOR LIMITING SOIL CONCENTRATION

\*\*\*\*\*

|                                 |           |
|---------------------------------|-----------|
| INTEGRATION TIME (years)        | 1         |
| BODY WEIGHT (kg)                | 7.000E+01 |
| AVERAGING TIME (days)           | 2.555E+04 |
| WATER INTAKE RATE (L/d)         | 2.000E+00 |
| EXPOSURE FREQUENCY (days/year)  | 3.500E+02 |
| EXPOSURE DURATION (years)       | 7.000E+01 |
| RADIOLOGICAL DOSE LIMIT (rem/y) | 4.000E-03 |
| CARCINOGENIC RISK CRITERIA      | 1.000E-06 |
| HAZARD QUOTIENT                 | 1.000E+00 |

>>> RESULTS OF CALCULATIONS

\*\*\*\*\*

#### MAXIMUM NON RADIOLOGICAL CONTAMINANT CALCULATION

|  |               |
|--|---------------|
| MAXIMUM CONCENTRATION                  | 5.53E-03 mg/L |
| AVERAGE CONCENTRATION                  | 5.53E-03 mg/L |
| PEAK TIME (y):                         | 2.165565E+04  |
| LIMITING SOIL CONCENTRATION (mg/m**3): | 1.058E+06     |
| LIMITING SOIL CONCENTRATION (mg/kg):   | 7.051E+02     |
| LIMITING INVENTORY IN SOIL (mg):       | 8.170E+10     |
| EXECUTION TIME (seconds)               | 3             |

## CFA Landfill II - benzo(a)anthracene

TIME OF RUN 19:47:52.6

DATE OF RUN 08/05/94

INPUT FILE NAME: benzoant.inp

OUTPUT FILE NAME: benzoant.out

### ACKNOWLEDGEMENT OF GOVERNMENT SPONSORSHIP AND LIMITATION OF LIABILITY

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```
*****
*
*   This output was produced by the model:
*
*   GWSCREEN
*   Version Control Copy, Version 2.02
*   A semi-analytical model for the assessment
*   of the groundwater pathway from the leaching
*   of surficial and buried contamination and
*   release of contaminants from percolation ponds
*   10-11-93
*   Arthur S. Rood
*   Idaho National Engineering Laboratory
*   EG&G Idaho Inc.
*   Subsurface and Environmental Modeling Unit
*   PO Box 1625
*   Idaho Falls, Idaho 83415
*****
```

>>> TITLE OF PROJECT:

CFA Landfill II - benzo(a)anthracene

### GAUSSIAN QUADRATURE SOLUTION

#### MODEL OPTIONS

IMODE: 4

KFLAG: 1 (0)CONC VS TIME; (1)PEAK CONC AND LIMITING SOIL CONC

IMODEL:1 (1) SURF OR BURIED SOURCE; (2)POND SOURCE; (3) TABULATED SOURCE FUNCTION

>>> INPUT DATA

```
*****
NUMBER OF RADIOACTIVE PROGENY          0
LENGTH OF SOURCE PARALLEL TO GW FLOW (m) 3.00E+02
WIDTH OF SOURCE PERPENDICULAR TO GW FLOW (m) 1.90E+02
THICKNESS OF SOURCE (m) 3.00E+00
PERCOLATION RATE (darcy vel m/y) 1.00E-01
VOLUMETRIC WATER CONTENT IN SOURCE 3.40E-01
VOLUMETRIC WATER CONTENT IN UNSATURATED ZONE 3.40E-01
BULK DENSITY AT SOURCE (g/cm**3) 1.50E+00
SORPTION COEFFICIENT AT SOURCE (ml/g) 4.14E+03
BULK DENSITY IN UNSAT ZONE (g/cm**3) 1.50E+00
UNSATURATED ZONE THICKNESS (m) 1.60E+01
```

|   |          |
|---|----------|
| SORPTION COEFFICIENT IN UNSAT ZONE (m <sup>1</sup> /g)    | 4.14E+03 |
| OPTIONAL LOSS RATE CONSTANT FOR SOURCE (y <sup>-1</sup> ) | 0.00E+00 |
| INITIAL MASS OR ACTIVITY (mg or Ci)                       | 1.69E+08 |
| MOLECULAR WEIGHT (g/mole)                                 | 1.00E+01 |
| SOLUBILITY LIMIT (mg/L)                                   | 5.70E-03 |
| HALF-LIFE(S) OF CONTAMINANT AND PROGENY (y)               | 1.00E+38 |
| BULK DENSITY OF AQUIFER (g/cm <sup>3</sup> )              | 1.90E+00 |
| POROSITY OF AQUIFER                                       | 1.00E-01 |
| SORPTION COEFFICIENT(S) IN AQUIFER (m <sup>1</sup> /g)    | 0.00E+00 |
| DISPERSIVITY X DIRECTION (m)                              | 9.00E+00 |
| DISPERSIVITY Y DIRECTION (m)                              | 4.00E+00 |
| PORE VELOCITY (m/y)                                       | 5.70E+02 |
| WELL SCREEN THICKNESS (m)                                 | 1.50E+01 |
| DISTANCE TO RECEPTOR ALONG X AXIS (m)                     | 1.50E+02 |
| DISTANCE TO RECEPTOR ALONG Y AXIS (m)                     | 0.00E+00 |
| LIMITING CONTAMINANT GW CONCENTRATION (mg/L)              | 1.00E-05 |
| UNITS OF CONTAMINANT                                      | mg       |

INPUT DATA FILE CREATED BY: J. Sandberg DATE 8/22/94

INPUT DATA CHECKED BY: Jim O. Magnus DATE 8/22/94

#### \*\*\*\*\* LIMITING SOIL CONCENTRATION CALCULATION

>>> VALUES CALCULATED IN SOURCE SUBROUTINE

\*\*\*\*\*

|   |            |
|---|------------|
| LEACH RATE CONSTANT (1/y)               | 5.3674E-06 |
| UNSATURATED PORE VELOCITY (m/y)         | 2.9412E-01 |
| DECAY CONSTANT(S) (1/y)                 | 0.0000E+00 |
| RETARDATION FACTOR(S) (SATURATED)       | 1.0000E+00 |
| RETARDATION FACTOR (UNSATURATED)        | 1.8266E+04 |
| SOLUBILITY LIMITED MASS (mg)            | 6.0532E+09 |
| SOLUBILITY LIMITED ACTIVITY (Ci)        | 0.0000E+00 |
| TRANSIT TIME IN UNSAT ZONE (years)      | 9.9365E+05 |
| FRACTION DECAYED DURING UNSAT TRANSPORT | 0.0000E+00 |

>>> EXPOSURE DATA FOR LIMITING SOIL CONCENTRATION

\*\*\*\*\*

|                                 |           |
|---------------------------------|-----------|
| INTEGRATION TIME (years)        | 1         |
| BODY WEIGHT (kg)                | 7.000E+01 |
| AVERAGING TIME (days)           | 2.555E+04 |
| WATER INTAKE RATE (L/d)         | 2.000E+00 |
| EXPOSURE FREQUENCY (days/year)  | 3.500E+02 |
| EXPOSURE DURATION (years)       | 7.000E+01 |
| RADIOLOGICAL DOSE LIMIT (rem/y) | 4.000E-03 |
| CARCINOGENIC RISK CRITERIA      | 1.000E-06 |
| HAZARD QUOTIENT                 | 1.000E+00 |

>>> RESULTS OF CALCULATIONS

\*\*\*\*\*

#### MAXIMUM NON RADIOLOGICAL CONTAMINANT CALCULATION

|   |               |
|---|---------------|
| MAXIMUM CONCENTRATION                             | 5.48E-06 mg/L |
| AVERAGE CONCENTRATION                             | 5.48E-06 mg/L |
| PEAK TIME (y):                                    | 9.936559E+05  |
| LIMITING SOIL CONCENTRATION (mg/m <sup>3</sup> ): | 1.805E+03     |
| LIMITING SOIL CONCENTRATION (mg/kg):              | 1.203E+00     |
| LIMITING INVENTORY IN SOIL (mg):                  | 3.086E+08     |
| EXECUTION TIME (seconds)                          | 3             |



## CFA Landfill II - benzo(a)pyrene

TIME OF RUN 19:47:59.0

DATE OF RUN 08/05/94

INPUT FILE NAME: benzopyr.inp

OUTPUT FILE NAME: benzopyr.out

=====

### ACKNOWLEDGEMENT OF GOVERNMENT SPONSORSHIP AND LIMITATION OF LIABILITY

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=====

\*\*\*\*\*

|  |   |
|--|---|
| *  | * |
| *     This output was produced by the model:         | * |
| *  | * |
| *                 GWSCREEN                           | * |
| *     Version Control Copy, Version 2.02             | * |
| *     A semi-analytical model for the assessment     | * |
| *     of the groundwater pathway from the leaching   | * |
| *     of surficial and buried contamination and      | * |
| *     release of contaminants from percolation ponds | * |
| *                 10-11-93                           | * |
| *                 Arthur S. Rood                     | * |
| *     Idaho National Engineering Laboratory          | * |
| *                 EG&G Idaho Inc.                    | * |
| *     Subsurface and Environmental Modeling Unit     | * |
| *                 PO Box 1625                        | * |
| *                 Idaho Falls, Idaho 83415           | * |

\*\*\*\*\*

>>> TITLE OF PROJECT:

CFA Landfill II - benzo(a)pyrene

-----

### GAUSSIAN QUADRATURE SOLUTION

#### MODEL OPTIONS

IMODE: 4

KFLAG: 1 (0)CONC VS TIME; (1)PEAK CONC AND LIMITING SOIL CONC

IMODEL:1 (1) SURF OR BURIED SOURCE; (2)POND SOURCE; (3) TABULATED SOURCE FUNCTION

>>> INPUT DATA

\*\*\*\*\*

|  |          |
|--|----------|
| NUMBER OF RADIOACTIVE PROGENY                | 0        |
| LENGTH OF SOURCE PARALLEL TO GW FLOW (m)     | 3.00E+02 |
| WIDTH OF SOURCE PERPENDICULAR TO GW FLOW (m) | 1.90E+02 |
| THICKNESS OF SOURCE (m)                      | 3.00E+00 |
| PERCOLATION RATE (darcy vel m/y)             | 1.00E-01 |
| VOLUMETRIC WATER CONTENT IN SOURCE           | 3.40E-01 |
| VOLUMETRIC WATER CONTENT IN UNSATURATED ZONE | 3.40E-01 |
| BULK DENSITY AT SOURCE (g/cm**3)             | 1.50E+00 |
| SORPTION COEFFICIENT AT SOURCE (ml/g)        | 1.65E+04 |
| BULK DENSITY IN UNSAT ZONE (g/cm**3)         | 1.50E+00 |
| UNSATURATED ZONE THICKNESS (m)               | 1.60E+01 |

|   |          |
|---|----------|
| SORPTION COEFFICIENT IN UNSAT ZONE (ml/g)                   | 1.65E+04 |
| OPTIONAL LOSS RATE CONSTANT FOR SOURCE (y** <sup>-1</sup> ) | 0.00E+00 |
| INITIAL MASS OR ACTIVITY (mg or Ci)                         | 3.85E+07 |
| MOLECULAR WEIGHT (g/mole)                                   | 1.00E+01 |
| SOLUBILITY LIMIT (mg/L)                                     | 1.20E-03 |
| HALF-LIFE(S) OF CONTAMINANT AND PROGENY (y)                 | 1.00E+38 |
| BULK DENSITY OF AQUIFER (g/cm**3)                           | 1.90E+00 |
| POROSITY OF AQUIFER   | 1.00E-01 |
| SORPTION COEFFICIENT(S) IN AQUIFER (ml/g)                   | 0.00E+00 |
| DISPERSIVITY X DIRECTION (m)                                | 9.00E+00 |
| DISPERSIVITY Y DIRECTION (m)                                | 4.00E+00 |
| PORE VELOCITY (m/y)   | 5.70E+02 |
| WELL SCREEN THICKNESS (m)                                   | 1.50E+01 |
| DISTANCE TO RECEPTOR ALONG X AXIS (m)                       | 1.50E+02 |
| DISTANCE TO RECEPTOR ALONG Y AXIS (m)                       | 0.00E+00 |
| LIMITING CONTAMINANT GW CONCENTRATION (mg/L)                | 1.00E-05 |
| UNITS OF CONTAMINANT  | mg       |

INPUT DATA FILE CREATED BY: J. Souders DATE 8/22/94

INPUT DATA CHECKED BY: John G. Magnus DATE 8/22/94

#### LIMITING SOIL CONCENTRATION CALCULATION

>>> VALUES CALCULATED IN SOURCE SUBROUTINE

\*\*\*\*\*

|   |            |
|---|------------|
| LEACH RATE CONSTANT (1/y)               | 1.3468E-06 |
| UNSATURATED PORE VELOCITY (m/y)         | 2.9412E-01 |
| DECAY CONSTANT(S) (1/y)                 | 0.0000E+00 |
| RETARDATION FACTOR(S) (SATURATED)       | 1.0000E+00 |
| RETARDATION FACTOR (UNSATURATED)        | 7.2795E+04 |
| SOLUBILITY LIMITED MASS (mg)            | 5.0788E+09 |
| SOLUBILITY LIMITED ACTIVITY (Ci)        | 0.0000E+00 |
| TRANSIT TIME IN UNSAT ZONE (years)      | 3.9601E+06 |
| FRACTION DECAYED DURING UNSAT TRANSPORT | 0.0000E+00 |

>>> EXPOSURE DATA FOR LIMITING SOIL CONCENTRATION

\*\*\*\*\*

|                                 |           |
|---------------------------------|-----------|
| INTEGRATION TIME (years)        | 1         |
| BODY WEIGHT (kg)                | 7.000E+01 |
| AVERAGING TIME (days)           | 2.555E+04 |
| WATER INTAKE RATE (L/d)         | 2.000E+00 |
| EXPOSURE FREQUENCY (days/year)  | 3.500E+02 |
| EXPOSURE DURATION (years)       | 7.000E+01 |
| RADIOLOGICAL DOSE LIMIT (rem/y) | 4.000E-03 |
| CARCINOGENIC RISK CRITERIA      | 1.000E-06 |
| HAZARD QUOTIENT                 | 1.000E+00 |

>>> RESULTS OF CALCULATIONS

\*\*\*\*\*

#### MAXIMUM NON RADIOLOGICAL CONTAMINANT CALCULATION

|  |               |
|--|---------------|
| MAXIMUM CONCENTRATION                  | 3.13E-07 mg/L |
| AVERAGE CONCENTRATION                  | 3.13E-07 mg/L |
| PEAK TIME (y):                         | 3.960056E+06  |
| LIMITING SOIL CONCENTRATION (mg/m**3): | 7.192E+03     |
| LIMITING SOIL CONCENTRATION (mg/kg):   | 4.795E+00     |
| LIMITING INVENTORY IN SOIL (mg):       | 1.230E+09     |
| EXECUTION TIME (seconds)               | 3             |

## CFA Landfill II - butylbenzylphthalate

TIME OF RUN 19:48:05.5  
DATE OF RUN 08/05/94  
INPUT FILE NAME: butylben.inp  
OUTPUT FILE NAME: butylben.out

### ACKNOWLEDGEMENT OF GOVERNMENT SPONSORSHIP AND LIMITATION OF LIABILITY

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```
*****
*                                     *
*   This output was produced by the model:   *
*                                     *
*               GWSCREEN               *
*   Version Control Copy, Version 2.02   *
*   A semi-analytical model for the assessment *
*   of the groundwater pathway from the leaching *
*   of surficial and buried contamination and *
*   release of contaminants from percolation ponds *
*   10-11-93                             *
*   Arthur S. Rood                         *
*   Idaho National Engineering Laboratory *
*   EG&G Idaho Inc.                       *
*   Subsurface and Environmental Modeling Unit *
*   PO Box 1625                           *
*   Idaho Falls, Idaho 83415              *
*****
```

>>> TITLE OF PROJECT:  
CFA Landfill II - butylbenzylphthalate

### GAUSSIAN QUADRATURE SOLUTION

#### MODEL OPTIONS

IMODE: 4

KFLAG: 1 (0)CONC VS TIME; (1)PEAK CONC AND LIMITING SOIL CONC

IMODEL: 1 (1) SURF OR BURIED SOURCE; (2)POND SOURCE; (3) TABULATED SOURCE FUNCTION

#### >>> INPUT DATA

```
*****
NUMBER OF RADIOACTIVE PROGENY          0
LENGTH OF SOURCE PARALLEL TO GW FLOW (m)  3.00E+02
WIDTH OF SOURCE PERPENDICULAR TO GW FLOW (m)  1.90E+02
THICKNESS OF SOURCE (m)                3.00E+00
PERCOLATION RATE (darcy vel m/y)        1.00E-01
VOLUMETRIC WATER CONTENT IN SOURCE      3.40E-01
VOLUMETRIC WATER CONTENT IN UNSATURATED ZONE 3.40E-01
BULK DENSITY AT SOURCE (g/cm**3)        1.50E+00
SORPTION COEFFICIENT AT SOURCE (ml/g)    7.20E+00
BULK DENSITY IN UNSAT ZONE (g/cm**3)     1.50E+00
UNSATURATED ZONE THICKNESS (m)          1.60E+01
```

SORPTION COEFFICIENT IN UNSAT ZONE (ml/g) 7.20E+00  
 OPTIONAL LOSS RATE CONSTANT FOR SOURCE (y\*\*-1) 0.00E+00  
 INITIAL MASS OR ACTIVITY (mg or Ci) 2.26E+07  
 MOLECULAR WEIGHT (g/mole) 1.00E+01  
 SOLUBILITY LIMIT (mg/L) 4.22E+01  
 HALF-LIFE(S) OF CONTAMINANT AND PROGENY (y) 1.00E+38  
 BULK DENSITY OF AQUIFER (g/cm\*\*3) 1.90E+00  
 POROSITY OF AQUIFER 1.00E-01  
 SORPTION COEFFICIENT(S) IN AQUIFER (ml/g) 0.00E+00  
 DISPERSIVITY X DIRECTION (m) 9.00E+00  
 DISPERSIVITY Y DIRECTION (m) 4.00E+00  
 PORE VELOCITY (m/y) 5.70E+02  
 WELL SCREEN THICKNESS (m) 1.50E+01  
 DISTANCE TO RECEPTOR ALONG X AXIS (m) 1.50E+02  
 DISTANCE TO RECEPTOR ALONG Y AXIS (m) 0.00E+00  
 LIMITING CONTAMINANT GW CONCENTRATION (mg/L) 7.00E+00  
 UNITS OF CONTAMINANT mg

INPUT DATA FILE CREATED BY: *Sondrup* DATE 8/22/94

INPUT DATA CHECKED BY: *Jim O. Magnus* DATE 8/22/94

-----  
 LIMITING SOIL CONCENTRATION CALCULATION

>>> VALUES CALCULATED IN SOURCE SUBROUTINE

\*\*\*\*\*

LEACH RATE CONSTANT (1/y) 2.9922E-03  
 UNSATURATED PORE VELOCITY (m/y) 2.9412E-01  
 DECAY CONSTANT(S) (1/y) 0.0000E+00  
 RETARDATION FACTOR(S) (SATURATED) 1.0000E+00  
 RETARDATION FACTOR (UNSATURATED) 3.2765E+01  
 SOLUBILITY LIMITED MASS (mg) 8.0388E+10  
 SOLUBILITY LIMITED ACTIVITY (Ci) 0.0000E+00  
 TRANSIT TIME IN UNSAT ZONE (years) 1.7824E+03  
 FRACTION DECAYED DURING UNSAT TRANSPORT 0.0000E+00

>>> EXPOSURE DATA FOR LIMITING SOIL CONCENTRATION

\*\*\*\*\*

INTEGRATION TIME (years) 1  
 BODY WEIGHT (kg) 7.000E+01  
 AVERAGING TIME (days) 2.555E+04  
 WATER INTAKE RATE (L/d) 2.000E+00  
 EXPOSURE FREQUENCY (days/year) 3.500E+02  
 EXPOSURE DURATION (years) 7.000E+01  
 RADIOLOGICAL DOSE LIMIT (rem/y) 4.000E-03  
 CARCINOGENIC RISK CRITERIA 1.000E-06  
 HAZARD QUOTIENT 1.000E+00

>>> RESULTS OF CALCULATIONS

\*\*\*\*\*

MAXIMUM NON RADIOLOGICAL CONTAMINANT CALCULATION

MAXIMUM CONCENTRATION 4.07E-04 mg/L

AVERAGE CONCENTRATION 4.07E-04 mg/L

PEAK TIME (y): 1.783455E+03

LIMITING SOIL CONCENTRATION (mg/m\*\*3): 2.272E+06

LIMITING SOIL CONCENTRATION (mg/kg): 1.514E+03

LIMITING INVENTORY IN SOIL (mg): 3.884E+11

WARNING !!! THE LIMITING SOIL MASS OF 3.884E+11 mg

EXCEEDS THE SOLUBILITY LIMITED SOURCE MASS OF 8.039E+10 mg

EXECUTION TIME (seconds) 4

## CFA Landfill II - chrysene

TIME OF RUN 19:48:12.1

DATE OF RUN 08/05/94

INPUT FILE NAME: chrysene.inp

OUTPUT FILE NAME: chrysene.out

### =====

#### ACKNOWLEDGEMENT OF GOVERNMENT SPONSORSHIP AND LIMITATION OF LIABILITY

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=====

\*\*\*\*\*  
\*  
\* This output was produced by the model: \*  
\*  
\* GWSCREEN \*  
\* Version Control Copy, Version 2.02 \*  
\* A semi-analytical model for the assessment \*  
\* of the groundwater pathway from the leaching \*  
\* of surficial and buried contamination and \*  
\* release of contaminants from percolation ponds \*  
\* 10-11-93 \*  
\* Arthur S. Rood \*  
\* Idaho National Engineering Laboratory \*  
\* EG&G Idaho Inc. \*  
\* Subsurface and Environmental Modeling Unit \*  
\* PO Box 1625 \*  
\* Idaho Falls, Idaho 83415 \*  
\*\*\*\*\*

>>> TITLE OF PROJECT:

CFA Landfill II - chrysene

#### GAUSSIAN QUADRATURE SOLUTION

##### MODEL OPTIONS

IMODE: 4

KFLAG: 1 (0)CONC VS TIME; (1)PEAK CONC AND LIMITING SOIL CONC

IMODEL:1 (1) SURF OR BURIED SOURCE; (2)POND SOURCE; (3) TABULATED SOURCE FUNCTION

>>> INPUT DATA

\*\*\*\*\*

|  |          |
|--|----------|
| NUMBER OF RADIOACTIVE PROGENY                | 0        |
| LENGTH OF SOURCE PARALLEL TO GW FLOW (m)     | 3.00E+02 |
| WIDTH OF SOURCE PERPENDICULAR TO GW FLOW (m) | 1.90E+02 |
| THICKNESS OF SOURCE (m)                      | 3.00E+00 |
| PERCOLATION RATE (darcy vel m/y)             | 1.00E-01 |
| VOLUMETRIC WATER CONTENT IN SOURCE           | 3.40E-01 |
| VOLUMETRIC WATER CONTENT IN UNSATURATED ZONE | 3.40E-01 |
| BULK DENSITY AT SOURCE (g/cm**3)             | 1.50E+00 |
| SORPTION COEFFICIENT AT SOURCE (ml/g)        | 6.00E+02 |
| BULK DENSITY IN UNSAT ZONE (g/cm**3)         | 1.50E+00 |
| UNSATURATED ZONE THICKNESS (m)               | 1.60E+01 |

|  |          |
|--|----------|
| SORPTION COEFFICIENT IN UNSAT ZONE (ml/g)      | 6.00E+02 |
| OPTIONAL LOSS RATE CONSTANT FOR SOURCE (y**-1) | 0.00E+00 |
| INITIAL MASS OR ACTIVITY (mg or Ci)            | 1.92E+08 |
| MOLECULAR WEIGHT (g/mole)                      | 1.00E+01 |
| SOLUBILITY LIMIT (mg/L)                        | 1.80E-03 |
| HALF-LIFE(S) OF CONTAMINANT AND PROGENY (y)    | 1.00E+38 |
| BULK DENSITY OF AQUIFER (g/cm**3)              | 1.90E+00 |
| POROSITY OF AQUIFER                            | 1.00E-01 |
| SORPTION COEFFICIENT(S) IN AQUIFER (ml/g)      | 0.00E+00 |
| DISPERSIVITY X DIRECTION (m)                   | 9.00E+00 |
| DISPERSIVITY Y DIRECTION (m)                   | 4.00E+00 |
| PORE VELOCITY (m/y)                            | 5.70E+02 |
| WELL SCREEN THICKNESS (m)                      | 1.50E+01 |
| DISTANCE TO RECEPTOR ALONG X AXIS (m)          | 1.50E+02 |
| DISTANCE TO RECEPTOR ALONG Y AXIS (m)          | 0.00E+00 |
| LIMITING CONTAMINANT GW CONCENTRATION (mg/L)   | 1.00E-05 |
| UNITS OF CONTAMINANT                           | mg       |

INPUT DATA FILE CREATED BY: Sondrup DATE 8/22/94

INPUT DATA CHECKED BY: John C. Mayrum DATE 8/22/94

-----  
LIMITING SOIL CONCENTRATION CALCULATION

>>> VALUES CALCULATED IN SOURCE SUBROUTINE

\*\*\*\*\*

|   |            |
|---|------------|
| LEACH RATE CONSTANT (1/y)               | 3.7023E-05 |
| UNSATURATED PORE VELOCITY (m/y)         | 2.9412E-01 |
| DECAY CONSTANT(S) (1/y)                 | 0.0000E+00 |
| RETARDATION FACTOR(S) (SATURATED)       | 1.0000E+00 |
| RETARDATION FACTOR (UNSATURATED)        | 2.6481E+03 |
| SOLUBILITY LIMITED MASS (mg)            | 2.7712E+08 |
| SOLUBILITY LIMITED ACTIVITY (Ci)        | 0.0000E+00 |
| TRANSIT TIME IN UNSAT ZONE (years)      | 1.4405E+05 |
| FRACTION DECAYED DURING UNSAT TRANSPORT | 0.0000E+00 |

>>> EXPOSURE DATA FOR LIMITING SOIL CONCENTRATION

\*\*\*\*\*

|                                 |           |
|---------------------------------|-----------|
| INTEGRATION TIME (years)        | 1         |
| BODY WEIGHT (kg)                | 7.000E+01 |
| AVERAGING TIME (days)           | 2.555E+04 |
| WATER INTAKE RATE (L/d)         | 2.000E+00 |
| EXPOSURE FREQUENCY (days/year)  | 3.500E+02 |
| EXPOSURE DURATION (years)       | 7.000E+01 |
| RADIOLOGICAL DOSE LIMIT (rem/y) | 4.000E-03 |
| CARCINOGENIC RISK CRITERIA      | 1.000E-06 |
| HAZARD QUOTIENT                 | 1.000E+00 |

>>> RESULTS OF CALCULATIONS

\*\*\*\*\*

MAXIMUM NON RADIOLOGICAL CONTAMINANT CALCULATION

|  |               |
|--|---------------|
| MAXIMUM CONCENTRATION                  | 4.29E-05 mg/L |
| AVERAGE CONCENTRATION                  | 4.29E-05 mg/L |
| PEAK TIME (y):                         | 1.440557E+05  |
| LIMITING SOIL CONCENTRATION (mg/m**3): | 2.616E+02     |
| LIMITING SOIL CONCENTRATION (mg/kg):   | 1.744E-01     |
| LIMITING INVENTORY IN SOIL (mg):       | 4.474E+07     |
| EXECUTION TIME (seconds)               | 3             |

## CFA Landfill II - fluoranthene

TIME OF RUN 19:48:18.4

DATE OF RUN 08/05/94

INPUT FILE NAME: fluorant.inp

OUTPUT FILE NAME: fluorant.out

### ACKNOWLEDGEMENT OF GOVERNMENT SPONSORSHIP AND LIMITATION OF LIABILITY

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```
*****
*                                     *
*   This output was produced by the model:   *
*                                     *
*               GWSCREEN               *
*   Version Control Copy, Version 2.02   *
*   A semi-analytical model for the assessment *
*   of the groundwater pathway from the leaching *
*   of surficial and buried contamination and *
*   release of contaminants from percolation ponds *
*   10-11-93                             *
*   Arthur S. Rood                        *
*   Idaho National Engineering Laboratory   *
*   EG&G Idaho Inc.                      *
*   Subsurface and Environmental Modeling Unit *
*   PO Box 1625                          *
*   Idaho Falls, Idaho 83415             *
*****
```

>>> TITLE OF PROJECT:

CFA Landfill II - fluoroanthene

### GAUSSIAN QUADRATURE SOLUTION

#### MODEL OPTIONS

IMODE: 4

KFLAG: 1 (0)CONC VS TIME; (1)PEAK CONC AND LIMITING SOIL CONC

IMODEL:1 (1) SURF OR BURIED SOURCE; (2)POND SOURCE; (3) TABULATED SOURCE FUNCTION

>>> INPUT DATA

```
*****
NUMBER OF RADIOACTIVE PROGENY           0
LENGTH OF SOURCE PARALLEL TO GW FLOW (m) 3.00E+02
WIDTH OF SOURCE PERPENDICULAR TO GW FLOW (m) 1.90E+02
THICKNESS OF SOURCE (m)                 3.00E+00
PERCOLATION RATE (darcy vel m/y)        1.00E-01
VOLUMETRIC WATER CONTENT IN SOURCE       3.40E-01
VOLUMETRIC WATER CONTENT IN UNSATURATED ZONE 3.40E-01
BULK DENSITY AT SOURCE (g/cm**3)        1.50E+00
SORPTION COEFFICIENT AT SOURCE (ml/g)    1.14E+02
BULK DENSITY IN UNSAT ZONE (g/cm**3)     1.50E+00
UNSATURATED ZONE THICKNESS (m)          1.60E+01
```

|  |          |
|--|----------|
| SORPTION COEFFICIENT IN UNSAT ZONE (ml/g)      | 1.14E+02 |
| OPTIONAL LOSS RATE CONSTANT FOR SOURCE (y**-1) | 0.00E+00 |
| INITIAL MASS OR ACTIVITY (mg or Ci)            | 1.62E+07 |
| MOLECULAR WEIGHT (g/mole)                      | 1.00E+01 |
| SOLUBILITY LIMIT (mg/L)                        | 2.06E-01 |
| HALF-LIFE(S) OF CONTAMINANT AND PROGENY (y)    | 1.00E+38 |
| BULK DENSITY OF AQUIFER (g/cm**3)              | 1.90E+00 |
| POROSITY OF AQUIFER                            | 1.00E-01 |
| SORPTION COEFFICIENT(S) IN AQUIFER (ml/g)      | 0.00E+00 |
| DISPERSIVITY X DIRECTION (m)                   | 9.00E+00 |
| DISPERSIVITY Y DIRECTION (m)                   | 4.00E+00 |
| PORE VELOCITY (m/y)                            | 5.70E+02 |
| WELL SCREEN THICKNESS (m)                      | 1.50E+01 |
| DISTANCE TO RECEPTOR ALONG X AXIS (m)          | 1.50E+02 |
| DISTANCE TO RECEPTOR ALONG Y AXIS (m)          | 0.00E+00 |
| LIMITING CONTAMINANT GW CONCENTRATION (mg/L)   | 1.00E+00 |
| UNITS OF CONTAMINANT                           | mg       |

INPUT DATA FILE CREATED BY: ASondrup DATE 8/22/94

INPUT DATA CHECKED BY: John O. Magnus DATE 8/22/94

#### LIMITING SOIL CONCENTRATION CALCULATION

##### >>> VALUES CALCULATED IN SOURCE SUBROUTINE

|   |            |
|---|------------|
| LEACH RATE CONSTANT (1/y)               | 1.9454E-04 |
| UNSATURATED PORE VELOCITY (m/y)         | 2.9412E-01 |
| DECAY CONSTANT(S) (1/y)                 | 0.0000E+00 |
| RETARDATION FACTOR(S) (SATURATED)       | 1.0000E+00 |
| RETARDATION FACTOR (UNSATURATED)        | 5.0394E+02 |
| SOLUBILITY LIMITED MASS (mg)            | 6.0356E+09 |
| SOLUBILITY LIMITED ACTIVITY (Ci)        | 0.0000E+00 |
| TRANSIT TIME IN UNSAT ZONE (years)      | 2.7414E+04 |
| FRACTION DECAYED DURING UNSAT TRANSPORT | 0.0000E+00 |

##### >>> EXPOSURE DATA FOR LIMITING SOIL CONCENTRATION

|                                 |           |
|---------------------------------|-----------|
| INTEGRATION TIME (years)        | 1         |
| BODY WEIGHT (kg)                | 7.000E+01 |
| AVERAGING TIME (days)           | 2.555E+04 |
| WATER INTAKE RATE (L/d)         | 2.000E+00 |
| EXPOSURE FREQUENCY (days/year)  | 3.500E+02 |
| EXPOSURE DURATION (years)       | 7.000E+01 |
| RADIOLOGICAL DOSE LIMIT (rem/y) | 4.000E-03 |
| CARCINOGENIC RISK CRITERIA      | 1.000E-06 |
| HAZARD QUOTIENT                 | 1.000E+00 |

##### >>> RESULTS OF CALCULATIONS

##### MAXIMUM NON RADIOLOGICAL CONTAMINANT CALCULATION

|  |               |
|--|---------------|
| MAXIMUM CONCENTRATION                                      | 1.90E-05 mg/L |
| AVERAGE CONCENTRATION                                      | 1.90E-05 mg/L |
| PEAK TIME (y):   | 2.741570E+04  |
| LIMITING SOIL CONCENTRATION (mg/m**3):                     | 4.980E+06     |
| LIMITING SOIL CONCENTRATION (mg/kg):                       | 3.320E+03     |
| LIMITING INVENTORY IN SOIL (mg):                           | 8.515E+11     |
| WARNING !!! THE LIMITING SOIL MASS OF 8.515E+11 mg         |               |
| EXCEEDS THE SOLUBILITY LIMITED SOURCE MASS OF 6.036E+09 mg |               |
| EXECUTION TIME (seconds)                                   | 3             |



## CFA Landfill II - 2-methylnaphthalene

TIME OF RUN 19:47:39.8  
DATE OF RUN 08/05/94  
INPUT FILE NAME: 2-methyl.inp  
OUTPUT FILE NAME: 2-methyl.out

### ACKNOWLEDGEMENT OF GOVERNMENT SPONSORSHIP AND LIMITATION OF LIABILITY

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```
*****
*
*   This output was produced by the model:
*
*   GWSCREEN
*   Version Control Copy, Version 2.02
*   A semi-analytical model for the assessment
*   of the groundwater pathway from the leaching
*   of surficial and buried contamination and
*   release of contaminants from percolation ponds
*   10-11-93
*   Arthur S. Rood
*   Idaho National Engineering Laboratory
*   EG&G Idaho Inc.
*   Subsurface and Environmental Modeling Unit
*   PO Box 1625
*   Idaho Falls, Idaho 83415
*****
```

>>> TITLE OF PROJECT:  
CFA Landfill II - 2-methylnaphthalene

### GAUSSIAN QUADRATURE SOLUTION

#### MODEL OPTIONS

IMODE: 4

KFLAG: 1 (0)CONC VS TIME; (1)PEAK CONC AND LIMITING SOIL CONC

IMODEL:1 (1) SURF OR BURIED SOURCE; (2)POND SOURCE; (3) TABULATED SOURCE FUNCTION

#### >>> INPUT DATA

```
*****
NUMBER OF RADIOACTIVE PROGENY          0
LENGTH OF SOURCE PARALLEL TO GW FLOW (m)  3.00E+02
WIDTH OF SOURCE PERPENDICULAR TO GW FLOW (m)  1.90E+02
THICKNESS OF SOURCE (m)                3.00E+00
PERCOLATION RATE (darcy vel m/y)        1.00E-01
VOLUMETRIC WATER CONTENT IN SOURCE      3.40E-01
VOLUMETRIC WATER CONTENT IN UNSATURATED ZONE  3.40E-01
BULK DENSITY AT SOURCE (g/cm**3)        1.50E+00
SORPTION COEFFICIENT AT SOURCE (ml/g)    2.55E+01
BULK DENSITY IN UNSAT ZONE (g/cm**3)    1.50E+00
UNSATURATED ZONE THICKNESS (m)          1.60E+01
```

|   |          |
|---|----------|
| SORPTION COEFFICIENT IN UNSAT ZONE (ml/g)                   | 2.55E+01 |
| OPTIONAL LOSS RATE CONSTANT FOR SOURCE (y** <sup>-1</sup> ) | 0.00E+00 |
| INITIAL MASS OR ACTIVITY (mg or Ci)                         | 1.21E+07 |
| MOLECULAR WEIGHT (g/mole)                                   | 1.00E+01 |
| SOLUBILITY LIMIT (mg/L)                                     | 2.54E+01 |
| HALF-LIFE(S) OF CONTAMINANT AND PROGENY (y)                 | 1.00E+38 |
| BULK DENSITY OF AQUIFER (g/cm**3)                           | 1.90E+00 |
| POROSITY OF AQUIFER   | 1.00E-01 |
| SORPTION COEFFICIENT(S) IN AQUIFER (ml/g)                   | 0.00E+00 |
| DISPERSIVITY X DIRECTION (m)                                | 9.00E+00 |
| DISPERSIVITY Y DIRECTION (m)                                | 4.00E+00 |
| PORE VELOCITY (m/y)   | 5.70E+02 |
| WELL SCREEN THICKNESS (m)                                   | 1.50E+01 |
| DISTANCE TO RECEPTOR ALONG X AXIS (m)                       | 1.50E+02 |
| DISTANCE TO RECEPTOR ALONG Y AXIS (m)                       | 0.00E+00 |
| LIMITING CONTAMINANT GW CONCENTRATION (mg/L)                | 0.00E+00 |
| UNITS OF CONTAMINANT  | mg       |

INPUT DATA FILE CREATED BY: Sondrup DATE 8/22/94

INPUT DATA CHECKED BY: Jim O. Magnus DATE 8/22/94

#### LIMITING SOIL CONCENTRATION CALCULATION

>>> VALUES CALCULATED IN SOURCE SUBROUTINE

\*\*\*\*\*

|   |            |
|---|------------|
| LEACH RATE CONSTANT (1/y)               | 8.6378E-04 |
| UNSATURATED PORE VELOCITY (m/y)         | 2.9412E-01 |
| DECAY CONSTANT(S) (1/y)                 | 0.0000E+00 |
| RETARDATION FACTOR(S) (SATURATED)       | 1.0000E+00 |
| RETARDATION FACTOR (UNSATURATED)        | 1.1350E+02 |
| SOLUBILITY LIMITED MASS (mg)            | 1.6761E+11 |
| SOLUBILITY LIMITED ACTIVITY (Ci)        | 0.0000E+00 |
| TRANSIT TIME IN UNSAT ZONE (years)      | 6.1744E+03 |
| FRACTION DECAYED DURING UNSAT TRANSPORT | 0.0000E+00 |

>>> EXPOSURE DATA FOR LIMITING SOIL CONCENTRATION

\*\*\*\*\*

|                                 |           |
|---------------------------------|-----------|
| INTEGRATION TIME (years)        | 1         |
| BODY WEIGHT (kg)                | 7.000E+01 |
| AVERAGING TIME (days)           | 2.555E+04 |
| WATER INTAKE RATE (L/d)         | 2.000E+00 |
| EXPOSURE FREQUENCY (days/year)  | 3.500E+02 |
| EXPOSURE DURATION (years)       | 7.000E+01 |
| RADIOLOGICAL DOSE LIMIT (rem/y) | 4.000E-03 |
| CARCINOGENIC RISK CRITERIA      | 1.000E-06 |
| HAZARD QUOTIENT                 | 1.000E+00 |

>>> RESULTS OF CALCULATIONS

\*\*\*\*\*

#### MAXIMUM NON RADIOLOGICAL CONTAMINANT CALCULATION

|  |               |
|--|---------------|
| MAXIMUM CONCENTRATION                  | 6.31E-05 mg/L |
| AVERAGE CONCENTRATION                  | 6.31E-05 mg/L |
| PEAK TIME (y):                         | 6.175539E+03  |
| LIMITING SOIL CONCENTRATION (mg/m**3): | 0.000E+00     |
| LIMITING SOIL CONCENTRATION (mg/kg):   | 0.000E+00     |
| LIMITING INVENTORY IN SOIL (mg):       | 0.000E+00     |
| EXECUTION TIME (seconds)               | 4             |

## CFA Landfill II - 4-methylphenol

TIME OF RUN 19:47:46.1  
DATE OF RUN 08/05/94  
INPUT FILE NAME: 4-methyl.inp  
OUTPUT FILE NAME: 4-methyl.out

### ACKNOWLEDGEMENT OF GOVERNMENT SPONSORSHIP AND LIMITATION OF LIABILITY

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```
*****
*                                     *
*   This output was produced by the model:   *
*                                     *
*               GWSCREEN               *
*   Version Control Copy, Version 2.02   *
*   A semi-analytical model for the assessment *
*   of the groundwater pathway from the leaching *
*   of surficial and buried contamination and *
*   release of contaminants from percolation ponds *
*   10-11-93                             *
*   Arthur S. Rood                         *
*   Idaho National Engineering Laboratory   *
*   EG&G Idaho Inc.                       *
*   Subsurface and Environmental Modeling Unit *
*   PO Box 1625                           *
*   Idaho Falls, Idaho 83415              *
*****
```

>>> TITLE OF PROJECT:  
CFA Landfill II - 4-methylphenol

### GAUSSIAN QUADRATURE SOLUTION

#### MODEL OPTIONS

IMODE: 4

KFLAG: 1 (0)CONC VS TIME; (1)PEAK CONC AND LIMITING SOIL CONC

IMODEL:1 (1) SURF OR BURIED SOURCE; (2)POND SOURCE; (3) TABULATED SOURCE FUNCTION

#### >>> INPUT DATA

```
*****
NUMBER OF RADIOACTIVE PROGENY          0
LENGTH OF SOURCE PARALLEL TO GW FLOW (m)  3.00E+02
WIDTH OF SOURCE PERPENDICULAR TO GW FLOW (m)  1.90E+02
THICKNESS OF SOURCE (m)                3.00E+00
PERCOLATION RATE (darcy vel m/y)        1.00E-01
VOLUMETRIC WATER CONTENT IN SOURCE      3.40E-01
VOLUMETRIC WATER CONTENT IN UNSATURATED ZONE  3.40E-01
BULK DENSITY AT SOURCE (g/cm**3)        1.50E+00
SORPTION COEFFICIENT AT SOURCE (ml/g)    1.08E+00
BULK DENSITY IN UNSAT ZONE (g/cm**3)    1.50E+00
UNSATURATED ZONE THICKNESS (m)          1.60E+01
```

|  |          |
|--|----------|
| SORPTION COEFFICIENT IN UNSAT ZONE (ml/g)      | 1.08E+00 |
| OPTIONAL LOSS RATE CONSTANT FOR SOURCE (y**-1) | 0.00E+00 |
| INITIAL MASS OR ACTIVITY (mg or Ci)            | 9.23E+07 |
| MOLECULAR WEIGHT (g/mole)                      | 1.00E+01 |
| SOLUBILITY LIMIT (mg/L)                        | 2.50E+04 |
| HALF-LIFE(S) OF CONTAMINANT AND PROGENY (y)    | 1.00E+38 |
| BULK DENSITY OF AQUIFER (g/cm**3)              | 1.90E+00 |
| POROSITY OF AQUIFER                            | 1.00E-01 |
| SORPTION COEFFICIENT(S) IN AQUIFER (ml/g)      | 0.00E+00 |
| DISPERSIVITY X DIRECTION (m)                   | 9.00E+00 |
| DISPERSIVITY Y DIRECTION (m)                   | 4.00E+00 |
| PORE VELOCITY (m/y)                            | 5.70E+02 |
| WELL SCREEN THICKNESS (m)                      | 1.50E+01 |
| DISTANCE TO RECEPTOR ALONG X AXIS (m)          | 1.50E+02 |
| DISTANCE TO RECEPTOR ALONG Y AXIS (m)          | 0.00E+00 |
| LIMITING CONTAMINANT GW CONCENTRATION (mg/L)   | 2.00E+00 |
| UNITS OF CONTAMINANT                           | mg       |

INPUT DATA FILE CREATED BY: J. Sondrup DATE 8/22/94

INPUT DATA CHECKED BY: John O. Mayrum DATE 8/22/94

-----  
LIMITING SOIL CONCENTRATION CALCULATION

>>> VALUES CALCULATED IN SOURCE SUBROUTINE

\*\*\*\*\*

|   |            |
|---|------------|
| LEACH RATE CONSTANT (1/y)               | 1.7007E-02 |
| UNSATURATED PORE VELOCITY (m/y)         | 2.9412E-01 |
| DECAY CONSTANT(S) (1/y)                 | 0.0000E+00 |
| RETARDATION FACTOR(S) (SATURATED)       | 1.0000E+00 |
| RETARDATION FACTOR (UNSATURATED)        | 5.7647E+00 |
| SOLUBILITY LIMITED MASS (mg)            | 8.3790E+12 |
| SOLUBILITY LIMITED ACTIVITY (Ci)        | 0.0000E+00 |
| TRANSIT TIME IN UNSAT ZONE (years)      | 3.1360E+02 |
| FRACTION DECAYED DURING UNSAT TRANSPORT | 0.0000E+00 |

>>> EXPOSURE DATA FOR LIMITING SOIL CONCENTRATION

\*\*\*\*\*

|                                 |           |
|---------------------------------|-----------|
| INTEGRATION TIME (years)        | 1         |
| BODY WEIGHT (kg)                | 7.000E+01 |
| AVERAGING TIME (days)           | 2.555E+04 |
| WATER INTAKE RATE (L/d)         | 2.000E+00 |
| EXPOSURE FREQUENCY (days/year)  | 3.500E+02 |
| EXPOSURE DURATION (years)       | 7.000E+01 |
| RADIOLOGICAL DOSE LIMIT (rem/y) | 4.000E-03 |
| CARCINOGENIC RISK CRITERIA      | 1.000E-06 |
| HAZARD QUOTIENT                 | 1.000E+00 |

>>> RESULTS OF CALCULATIONS

\*\*\*\*\*

MAXIMUM NON RADIOLOGICAL CONTAMINANT CALCULATION

|  |               |
|--|---------------|
| MAXIMUM CONCENTRATION                  | 9.36E-03 mg/L |
| AVERAGE CONCENTRATION                  | 9.36E-03 mg/L |
| PEAK TIME (y):                         | 3.145288E+02  |
| LIMITING SOIL CONCENTRATION (mg/m**3): | 1.153E+05     |
| LIMITING SOIL CONCENTRATION (mg/kg):   | 7.686E+01     |
| LIMITING INVENTORY IN SOIL (mg):       | 1.971E+10     |
| EXECUTION TIME (seconds)               | 4             |

## CFA Landfill II - pentachlorophenol

TIME OF RUN 19:48:24.9

DATE OF RUN 08/05/94

INPUT FILE NAME: pentach1.inp

OUTPUT FILE NAME: pentach1.out

### ACKNOWLEDGEMENT OF GOVERNMENT SPONSORSHIP AND LIMITATION OF LIABILITY

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```
*****
*                                     *
*   This output was produced by the model:   *
*                                     *
*               GWSCREEN               *
*   Version Control Copy, Version 2.02   *
*   A semi-analytical model for the assessment *
*   of the groundwater pathway from the leaching *
*   of surficial and buried contamination and *
*   release of contaminants from percolation ponds *
*   10-11-93                             *
*   Arthur S. Rood                         *
*   Idaho National Engineering Laboratory   *
*   EG&G Idaho Inc.                       *
*   Subsurface and Environmental Modeling Unit *
*   PO Box 1625                           *
*   Idaho Falls, Idaho 83415              *
*****
```

>>> TITLE OF PROJECT:  
CFA Landfill II - pentachlorophenol

### GAUSSIAN QUADRATURE SOLUTION

#### MODEL OPTIONS

IMODE: 4

KFLAG: 1 (0)CONC VS TIME; (1)PEAK CONC AND LIMITING SOIL CONC

IMODEL:1 (1) SURF OR BURIED SOURCE; (2)POND SOURCE; (3) TABULATED SOURCE FUNCTION

#### >>> INPUT DATA

```
*****
NUMBER OF RADIOACTIVE PROGENY          0
LENGTH OF SOURCE PARALLEL TO GW FLOW (m)  3.00E+02
WIDTH OF SOURCE PERPENDICULAR TO GW FLOW (m)  1.90E+02
THICKNESS OF SOURCE (m)                3.00E+00
PERCOLATION RATE (darcy vel m/y)        1.00E-01
VOLUMETRIC WATER CONTENT IN SOURCE      3.40E-01
VOLUMETRIC WATER CONTENT IN UNSATURATED ZONE  3.40E-01
BULK DENSITY AT SOURCE (g/cm**3)        1.50E+00
SORPTION COEFFICIENT AT SOURCE (ml/g)    1.59E+02
BULK DENSITY IN UNSAT ZONE (g/cm**3)    1.50E+00
UNSATURATED ZONE THICKNESS (m)          1.60E+01
```

|  |          |
|--|----------|
| SORPTION COEFFICIENT IN UNSAT ZONE (ml/g)      | 1.59E+02 |
| OPTIONAL LOSS RATE CONSTANT FOR SOURCE (y**-1) | 0.00E+00 |
| INITIAL MASS OR ACTIVITY (mg or Ci)            | 1.90E+07 |
| MOLECULAR WEIGHT (g/mole)                      | 1.00E+01 |
| SOLUBILITY LIMIT (mg/L)                        | 1.40E+01 |
| HALF-LIFE(S) OF CONTAMINANT AND PROGENY (y)    | 1.00E+38 |
| BULK DENSITY OF AQUIFER (g/cm**3)              | 1.90E+00 |
| POROSITY OF AQUIFER                            | 1.00E-01 |
| SORPTION COEFFICIENT(S) IN AQUIFER (ml/g)      | 0.00E+00 |
| DISPERSIVITY X DIRECTION (m)                   | 9.00E+00 |
| DISPERSIVITY Y DIRECTION (m)                   | 4.00E+00 |
| PORE VELOCITY (m/y)                            | 5.70E+02 |
| WELL SCREEN THICKNESS (m)                      | 1.50E+01 |
| DISTANCE TO RECEPTOR ALONG X AXIS (m)          | 1.50E+02 |
| DISTANCE TO RECEPTOR ALONG Y AXIS (m)          | 0.00E+00 |
| LIMITING CONTAMINANT GW CONCENTRATION (mg/L)   | 7.00E-04 |
| UNITS OF CONTAMINANT                           | mg       |

INPUT DATA FILE CREATED BY: Bondrup DATE 8/22/94

INPUT DATA CHECKED BY: Don O. Maynum DATE 8/22/94

#### LIMITING SOIL CONCENTRATION CALCULATION

>>> VALUES CALCULATED IN SOURCE SUBROUTINE

\*\*\*\*\*

|   |            |
|---|------------|
| LEACH RATE CONSTANT (1/y)               | 1.3956E-04 |
| UNSATURATED PORE VELOCITY (m/y)         | 2.9412E-01 |
| DECAY CONSTANT(S) (1/y)                 | 0.0000E+00 |
| RETARDATION FACTOR(S) (SATURATED)       | 1.0000E+00 |
| RETARDATION FACTOR (UNSATURATED)        | 7.0247E+02 |
| SOLUBILITY LIMITED MASS (mg)            | 5.7178E+11 |
| SOLUBILITY LIMITED ACTIVITY (Ci)        | 0.0000E+00 |
| TRANSIT TIME IN UNSAT ZONE (years)      | 3.8214E+04 |
| FRACTION DECAYED DURING UNSAT TRANSPORT | 0.0000E+00 |

>>> EXPOSURE DATA FOR LIMITING SOIL CONCENTRATION

\*\*\*\*\*

|                                 |           |
|---------------------------------|-----------|
| INTEGRATION TIME (years)        | 1         |
| BODY WEIGHT (kg)                | 7.000E+01 |
| AVERAGING TIME (days)           | 2.555E+04 |
| WATER INTAKE RATE (L/d)         | 2.000E+00 |
| EXPOSURE FREQUENCY (days/year)  | 3.500E+02 |
| EXPOSURE DURATION (years)       | 7.000E+01 |
| RADIOLOGICAL DOSE LIMIT (rem/y) | 4.000E-03 |
| CARCINOGENIC RISK CRITERIA      | 1.000E-06 |
| HAZARD QUOTIENT                 | 1.000E+00 |

>>> RESULTS OF CALCULATIONS

\*\*\*\*\*

#### MAXIMUM NON RADIOLOGICAL CONTAMINANT CALCULATION

|  |               |
|--|---------------|
| MAXIMUM CONCENTRATION                  | 1.60E-05 mg/L |
| AVERAGE CONCENTRATION                  | 1.60E-05 mg/L |
| PEAK TIME (y):                         | 3.821570E+04  |
| LIMITING SOIL CONCENTRATION (mg/m**3): | 4.859E+03     |
| LIMITING SOIL CONCENTRATION (mg/kg):   | 3.239E+00     |
| LIMITING INVENTORY IN SOIL (mg):       | 8.308E+08     |
| EXECUTION TIME (seconds)               | 3             |

## CFA Landfill II - phenanthrene

TIME OF RUN 19:48:31.2

DATE OF RUN 08/05/94

INPUT FILE NAME: phenanth.inp

OUTPUT FILE NAME: phenanth.out

### ACKNOWLEDGEMENT OF GOVERNMENT SPONSORSHIP AND LIMITATION OF LIABILITY

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```
*****
*                                     *
*   This output was produced by the model:   *
*                                     *
*               GWSCREEN               *
*   Version Control Copy, Version 2.02   *
*   A semi-analytical model for the assessment *
*   of the groundwater pathway from the leaching *
*   of surficial and buried contamination and *
*   release of contaminants from percolation ponds *
*               10-11-93               *
*               Arthur S. Rood          *
*   Idaho National Engineering Laboratory *
*               EG&G Idaho Inc.         *
*   Subsurface and Environmental Modeling Unit *
*               PO Box 1625             *
*               Idaho Falls, Idaho 83415  *
*****
```

>>> TITLE OF PROJECT:

CFA Landfill II - phenanthrene

### GAUSSIAN QUADRATURE SOLUTION

#### MODEL OPTIONS

IMODE: 4

KFLAG: 1 (0)CONC VS TIME; (1)PEAK CONC AND LIMITING SOIL CONC

IMODEL:1 (1) SURF OR BURIED SOURCE; (2)POND SOURCE; (3) TABULATED SOURCE FUNCTION

>>> INPUT DATA

```
*****
NUMBER OF RADIOACTIVE PROGENY          0
LENGTH OF SOURCE PARALLEL TO GW FLOW (m)  3.00E+02
WIDTH OF SOURCE PERPENDICULAR TO GW FLOW (m)  1.90E+02
THICKNESS OF SOURCE (m)                3.00E+00
PERCOLATION RATE (darcy vel m/y)        1.00E-01
VOLUMETRIC WATER CONTENT IN SOURCE       3.40E-01
VOLUMETRIC WATER CONTENT IN UNSATURATED ZONE  3.40E-01
BULK DENSITY AT SOURCE (g/cm**3)        1.50E+00
SORPTION COEFFICIENT AT SOURCE (ml/g)    4.20E+01
BULK DENSITY IN UNSAT ZONE (g/cm**3)     1.50E+00
UNSATURATED ZONE THICKNESS (m)           1.60E+01
```

|  |          |
|--|----------|
| SORPTION COEFFICIENT IN UNSAT ZONE (ml/g)      | 4.20E+01 |
| OPTIONAL LOSS RATE CONSTANT FOR SOURCE (y**-1) | 0.00E+00 |
| INITIAL MASS OR ACTIVITY (mg or Ci)            | 4.10E+07 |
| MOLECULAR WEIGHT (g/mole)                      | 1.00E+01 |
| SOLUBILITY LIMIT (mg/L)                        | 1.00E+00 |
| HALF-LIFE(S) OF CONTAMINANT AND PROGENY (y)    | 1.00E+38 |
| BULK DENSITY OF AQUIFER (g/cm**3)              | 1.90E+00 |
| POROSITY OF AQUIFER                            | 1.00E-01 |
| SORPTION COEFFICIENT(S) IN AQUIFER (ml/g)      | 0.00E+00 |
| DISPERSIVITY X DIRECTION (m)                   | 9.00E+00 |
| DISPERSIVITY Y DIRECTION (m)                   | 4.00E+00 |
| PORE VELOCITY (m/y)                            | 5.70E+02 |
| WELL SCREEN THICKNESS (m)                      | 1.50E+01 |
| DISTANCE TO RECEPTOR ALONG X AXIS (m)          | 1.50E+02 |
| DISTANCE TO RECEPTOR ALONG Y AXIS (m)          | 0.00E+00 |
| LIMITING CONTAMINANT GW CONCENTRATION (mg/L)   | 0.00E+00 |
| UNITS OF CONTAMINANT                           | mg       |

INPUT DATA FILE CREATED BY: *Sondrup* DATE 8/22/94

INPUT DATA CHECKED BY: *Sam G. Magnus* DATE 8/22/94

#### LIMITING SOIL CONCENTRATION CALCULATION

>>> VALUES CALCULATED IN SOURCE SUBROUTINE

|   |            |
|---|------------|
| LEACH RATE CONSTANT (1/y)               | 5.2626E-04 |
| UNSATURATED PORE VELOCITY (m/y)         | 2.9412E-01 |
| DECAY CONSTANT(S) (1/y)                 | 0.0000E+00 |
| RETARDATION FACTOR(S) (SATURATED)       | 1.0000E+00 |
| RETARDATION FACTOR (UNSATURATED)        | 1.8629E+02 |
| SOLUBILITY LIMITED MASS (mg)            | 1.0831E+10 |
| SOLUBILITY LIMITED ACTIVITY (Ci)        | 0.0000E+00 |
| TRANSIT TIME IN UNSAT ZONE (years)      | 1.0134E+04 |
| FRACTION DECAYED DURING UNSAT TRANSPORT | 0.0000E+00 |

>>> EXPOSURE DATA FOR LIMITING SOIL CONCENTRATION

|                                 |           |
|---------------------------------|-----------|
| INTEGRATION TIME (years)        | 1         |
| BODY WEIGHT (kg)                | 7.000E+01 |
| AVERAGING TIME (days)           | 2.555E+04 |
| WATER INTAKE RATE (L/d)         | 2.000E+00 |
| EXPOSURE FREQUENCY (days/year)  | 3.500E+02 |
| EXPOSURE DURATION (years)       | 7.000E+01 |
| RADIOLOGICAL DOSE LIMIT (rem/y) | 4.000E-03 |
| CARCINOGENIC RISK CRITERIA      | 1.000E-06 |
| HAZARD QUOTIENT                 | 1.000E+00 |

>>> RESULTS OF CALCULATIONS

|  |               |
|--|---------------|
| MAXIMUM NON RADIOLOGICAL CONTAMINANT CALCULATION |               |
| MAXIMUM CONCENTRATION                            | 1.30E-04 mg/L |
| AVERAGE CONCENTRATION                            | 1.30E-04 mg/L |
| PEAK TIME (y):                                   | 1.013554E+04  |
| LIMITING SOIL CONCENTRATION (mg/m**3):           | 0.000E+00     |
| LIMITING SOIL CONCENTRATION (mg/kg):             | 0.000E+00     |
| LIMITING INVENTORY IN SOIL (mg):                 | 0.000E+00     |
| EXECUTION TIME (seconds)                         | 4             |



## CFA Landfill II - phenol

TIME OF RUN 19:48:37.9  
DATE OF RUN 08/05/94  
INPUT FILE NAME: phenol.inp  
OUTPUT FILE NAME: phenol.out

### =====

#### ACKNOWLEDGEMENT OF GOVERNMENT SPONSORSHIP AND LIMITATION OF LIABILITY

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=====

\*\*\*\*\*  
\*  
\* This output was produced by the model: \*  
\*  
\* GWSCREEN \*  
\* Version Control Copy, Version 2.02 \*  
\* A semi-analytical model for the assessment \*  
\* of the groundwater pathway from the leaching \*  
\* of surficial and buried contamination and \*  
\* release of contaminants from percolation ponds \*  
\* 10-11-93 \*  
\* Arthur S. Rood \*  
\* Idaho National Engineering Laboratory \*  
\* EG&G Idaho Inc. \*  
\* Subsurface and Environmental Modeling Unit \*  
\* PO Box 1625 \*  
\* Idaho Falls, Idaho 83415 \*  
\*\*\*\*\*

>>> TITLE OF PROJECT:  
CFA Landfill II - phenol

#### =====

#### GAUSSIAN QUADRATURE SOLUTION

##### MODEL OPTIONS

IMODE: 4

KFLAG: 1 (0)CONC VS TIME; (1)PEAK CONC AND LIMITING SOIL CONC

IMODEL:1 (1) SURF OR BURIED SOURCE; (2)POND SOURCE; (3) TABULATED SOURCE FUNCTION

##### >>> INPUT DATA

\*\*\*\*\*

|  |          |
|--|----------|
| NUMBER OF RADIOACTIVE PROGENY                | 0        |
| LENGTH OF SOURCE PARALLEL TO GW FLOW (m)     | 3.00E+02 |
| WIDTH OF SOURCE PERPENDICULAR TO GW FLOW (m) | 1.90E+02 |
| THICKNESS OF SOURCE (m)                      | 3.00E+00 |
| PERCOLATION RATE (darcy vel m/y)             | 1.00E-01 |
| VOLUMETRIC WATER CONTENT IN SOURCE           | 3.40E-01 |
| VOLUMETRIC WATER CONTENT IN UNSATURATED ZONE | 3.40E-01 |
| BULK DENSITY AT SOURCE (g/cm**3)             | 1.50E+00 |
| SORPTION COEFFICIENT AT SOURCE (ml/g)        | 4.26E-02 |
| BULK DENSITY IN UNSAT ZONE (g/cm**3)         | 1.50E+00 |
| UNSATURATED ZONE THICKNESS (m)               | 1.60E+01 |

|  |          |
|--|----------|
| SORPTION COEFFICIENT IN UNSAT ZONE (ml/g)      | 4.26E-02 |
| OPTIONAL LOSS RATE CONSTANT FOR SOURCE (y**-1) | 0.00E+00 |
| INITIAL MASS OR ACTIVITY (mg or Ci)            | 2.26E+07 |
| MOLECULAR WEIGHT (g/mole)                      | 1.00E+01 |
| SOLUBILITY LIMIT (mg/L)                        | 9.30E+04 |
| HALF-LIFE(S) OF CONTAMINANT AND PROGENY (y)    | 1.00E+38 |
| BULK DENSITY OF AQUIFER (g/cm**3)              | 1.90E+00 |
| POROSITY OF AQUIFER                            | 1.00E-01 |
| SORPTION COEFFICIENT(S) IN AQUIFER (ml/g)      | 0.00E+00 |
| DISPERSIVITY X DIRECTION (m)                   | 9.00E+00 |
| DISPERSIVITY Y DIRECTION (m)                   | 4.00E+00 |
| PORE VELOCITY (m/y)                            | 5.70E+02 |
| WELL SCREEN THICKNESS (m)                      | 1.50E+01 |
| DISTANCE TO RECEPTOR ALONG X AXIS (m)          | 1.50E+02 |
| DISTANCE TO RECEPTOR ALONG Y AXIS (m)          | 0.00E+00 |
| LIMITING CONTAMINANT GW CONCENTRATION (mg/L)   | 2.00E+01 |
| UNITS OF CONTAMINANT                           | mg       |

INPUT DATA FILE CREATED BY: Sondrup DATE 8/22/94

INPUT DATA CHECKED BY: John G. Magnus DATE 8/22/94

#### LIMITING SOIL CONCENTRATION CALCULATION

>>> VALUES CALCULATED IN SOURCE SUBROUTINE

\*\*\*\*\*

|   |            |
|---|------------|
| LEACH RATE CONSTANT (1/y)               | 8.2529E-02 |
| UNSATURATED PORE VELOCITY (m/y)         | 2.9412E-01 |
| DECAY CONSTANT(S) (1/y)                 | 0.0000E+00 |
| RETARDATION FACTOR(S) (SATURATED)       | 1.0000E+00 |
| RETARDATION FACTOR (UNSATURATED)        | 1.1879E+00 |
| SOLUBILITY LIMITED MASS (mg)            | 6.4232E+12 |
| SOLUBILITY LIMITED ACTIVITY (Ci)        | 0.0000E+00 |
| TRANSIT TIME IN UNSAT ZONE (years)      | 6.4624E+01 |
| FRACTION DECAYED DURING UNSAT TRANSPORT | 0.0000E+00 |

>>> EXPOSURE DATA FOR LIMITING SOIL CONCENTRATION

\*\*\*\*\*

|                                 |           |
|---------------------------------|-----------|
| INTEGRATION TIME (years)        | 1         |
| BODY WEIGHT (kg)                | 7.000E+01 |
| AVERAGING TIME (days)           | 2.555E+04 |
| WATER INTAKE RATE (L/d)         | 2.000E+00 |
| EXPOSURE FREQUENCY (days/year)  | 3.500E+02 |
| EXPOSURE DURATION (years)       | 7.000E+01 |
| RADIOLOGICAL DOSE LIMIT (rem/y) | 4.000E-03 |
| CARCINOGENIC RISK CRITERIA      | 1.000E-06 |
| HAZARD QUOTIENT                 | 1.000E+00 |

>>> RESULTS OF CALCULATIONS

\*\*\*\*\*

#### MAXIMUM NON RADIOLOGICAL CONTAMINANT CALCULATION

|  |               |
|--|---------------|
| MAXIMUM CONCENTRATION                  | 1.07E-02 mg/L |
| AVERAGE CONCENTRATION                  | 1.07E-02 mg/L |
| PEAK TIME (y):                         | 6.541896E+01  |
| LIMITING SOIL CONCENTRATION (mg/m**3): | 2.463E+05     |
| LIMITING SOIL CONCENTRATION (mg/kg):   | 1.642E+02     |
| LIMITING INVENTORY IN SOIL (mg):       | 4.212E+10     |
| EXECUTION TIME (seconds)               | 4             |

## CFA Landfill II - pyrene

TIME OF RUN 19:48:44.6

DATE OF RUN 08/05/94

INPUT FILE NAME: pyrene.inp

OUTPUT FILE NAME: pyrene.out

### ACKNOWLEDGEMENT OF GOVERNMENT SPONSORSHIP AND LIMITATION OF LIABILITY

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```
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*                                     *
*   This output was produced by the model:   *
*                                     *
*               GWSCREEN               *
*   Version Control Copy, Version 2.02   *
*   A semi-analytical model for the assessment *
*   of the groundwater pathway from the leaching *
*   of surficial and buried contamination and *
*   release of contaminants from percolation ponds *
*   10-11-93                             *
*   Arthur S. Rood                         *
*   Idaho National Engineering Laboratory   *
*   EG&G Idaho Inc.                       *
*   Subsurface and Environmental Modeling Unit *
*   PO Box 1625                           *
*   Idaho Falls, Idaho 83415              *
*****
```

>>> TITLE OF PROJECT:  
CFA Landfill II - pyrene

### GAUSSIAN QUADRATURE SOLUTION

#### MODEL OPTIONS

IMODE: 4

KFLAG: 1 (0)CONC VS TIME; (1)PEAK CONC AND LIMITING SOIL CONC

IMODEL:1 (1) SURF OR BURIED SOURCE; (2)POND SOURCE; (3) TABULATED SOURCE FUNCTION

#### >>> INPUT DATA

```
*****
NUMBER OF RADIOACTIVE PROGENY           0
LENGTH OF SOURCE PARALLEL TO GW FLOW (m) 3.00E+02
WIDTH OF SOURCE PERPENDICULAR TO GW FLOW (m) 1.90E+02
THICKNESS OF SOURCE (m)                 3.00E+00
PERCOLATION RATE (darcy vel m/y)        1.00E-01
VOLUMETRIC WATER CONTENT IN SOURCE      3.40E-01
VOLUMETRIC WATER CONTENT IN UNSATURATED ZONE 3.40E-01
BULK DENSITY AT SOURCE (g/cm**3)        1.50E+00
SORPTION COEFFICIENT AT SOURCE (ml/g)    1.14E+02
BULK DENSITY IN UNSAT ZONE (g/cm**3)    1.50E+00
UNSATURATED ZONE THICKNESS (m)          1.60E+01
```

|   |          |
|---|----------|
| SORPTION COEFFICIENT IN UNSAT ZONE (ml/g)                   | 1.14E+02 |
| OPTIONAL LOSS RATE CONSTANT FOR SOURCE (y** <sup>-1</sup> ) | 0.00E+00 |
| INITIAL MASS OR ACTIVITY (mg or Ci)                         | 6.93E+07 |
| MOLECULAR WEIGHT (g/mole)                                   | 1.00E+01 |
| SOLUBILITY LIMIT (mg/L)                                     | 1.32E-01 |
| HALF-LIFE(S) OF CONTAMINANT AND PROGENY (y)                 | 1.00E+38 |
| BULK DENSITY OF AQUIFER (g/cm**3)                           | 1.90E+00 |
| POROSITY OF AQUIFER   | 1.00E-01 |
| SORPTION COEFFICIENT(S) IN AQUIFER (ml/g)                   | 0.00E+00 |
| DISPERSIVITY X DIRECTION (m)                                | 9.00E+00 |
| DISPERSIVITY Y DIRECTION (m)                                | 4.00E+00 |
| PORE VELOCITY (m/y)   | 5.70E+02 |
| WELL SCREEN THICKNESS (m)                                   | 1.50E+01 |
| DISTANCE TO RECEPTOR ALONG X AXIS (m)                       | 1.50E+02 |
| DISTANCE TO RECEPTOR ALONG Y AXIS (m)                       | 0.00E+00 |
| LIMITING CONTAMINANT GW CONCENTRATION (mg/L)                | 1.00E+00 |
| UNITS OF CONTAMINANT  | mg       |

INPUT DATA FILE CREATED BY: Sondrup DATE 8/22/94

INPUT DATA CHECKED BY: John O. Mayman DATE 8/22/94

# LIMITING SOIL CONCENTRATION CALCULATION

>>> VALUES CALCULATED IN SOURCE SUBROUTINE

\*\*\*\*\*

|   |            |
|---|------------|
| LEACH RATE CONSTANT (1/y)               | 1.9454E-04 |
| UNSATURATED PORE VELOCITY (m/y)         | 2.9412E-01 |
| DECAY CONSTANT(S) (1/y)                 | 0.0000E+00 |
| RETARDATION FACTOR(S) (SATURATED)       | 1.0000E+00 |
| RETARDATION FACTOR (UNSATURATED)        | 5.0394E+02 |
| SOLUBILITY LIMITED MASS (mg)            | 3.8675E+09 |
| SOLUBILITY LIMITED ACTIVITY (Ci)        | 0.0000E+00 |
| TRANSIT TIME IN UNSAT ZONE (years)      | 2.7414E+04 |
| FRACTION DECAYED DURING UNSAT TRANSPORT | 0.0000E+00 |

>>> EXPOSURE DATA FOR LIMITING SOIL CONCENTRATION

\*\*\*\*\*

|                                 |           |
|---------------------------------|-----------|
| INTEGRATION TIME (years)        | 1         |
| BODY WEIGHT (kg)                | 7.000E+01 |
| AVERAGING TIME (days)           | 2.555E+04 |
| WATER INTAKE RATE (L/d)         | 2.000E+00 |
| EXPOSURE FREQUENCY (days/year)  | 3.500E+02 |
| EXPOSURE DURATION (years)       | 7.000E+01 |
| RADIOLOGICAL DOSE LIMIT (rem/y) | 4.000E-03 |
| CARCINOGENIC RISK CRITERIA      | 1.000E-06 |
| HAZARD QUOTIENT                 | 1.000E+00 |

>>> RESULTS OF CALCULATIONS

\*\*\*\*\*

## MAXIMUM NON RADIOLOGICAL CONTAMINANT CALCULATION

|   |               |
|---|---------------|
| MAXIMUM CONCENTRATION                         | 8.14E-05 mg/L |
| AVERAGE CONCENTRATION                         | 8.14E-05 mg/L |
| PEAK TIME (y):                                | 2.741570E+04  |
| LIMITING SOIL CONCENTRATION (mg/m**3):        | 4.980E+06     |
| LIMITING SOIL CONCENTRATION (mg/kg):          | 3.320E+03     |
| LIMITING INVENTORY IN SOIL (mg):              | 8.515E+11     |
| WARNING !!! THE LIMITING SOIL MASS OF         | 8.515E+11 mg  |
| EXCEEDS THE SOLUBILITY LIMITED SOURCE MASS OF | 3.867E+09 mg  |
| EXECUTION TIME (seconds)                      | 3             |

## CFA Landfill II - carbon disulfide

TIME OF RUN 19:46:13.8

DATE OF RUN 08/05/94

INPUT FILE NAME: carbondi.inp

OUTPUT FILE NAME: carbondi.out

=====

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|  |   |
|--|---|
| *  | * |
| * This output was produced by the model:         | * |
| *  | * |
| * GWSCREEN                                       | * |
| * Version Control Copy, Version 2.02             | * |
| * A semi-analytical model for the assessment     | * |
| * of the groundwater pathway from the leaching   | * |
| * of surficial and buried contamination and      | * |
| * release of contaminants from percolation ponds | * |
| * 10-11-93                                       | * |
| * Arthur S. Rood                                 | * |
| * Idaho National Engineering Laboratory          | * |
| * EG&G Idaho Inc.                                | * |
| * Subsurface and Environmental Modeling Unit     | * |
| * PO Box 1625                                    | * |
| * Idaho Falls, Idaho 83415                       | * |

\*\*\*\*\*

>>> TITLE OF PROJECT:

CFA Landfill II - carbon-disulfide

=====

### GAUSSIAN QUADRATURE SOLUTION

#### MODEL OPTIONS

IMODE: 4

KFLAG: 1 (0)CONC VS TIME; (1)PEAK CONC AND LIMITING SOIL CONC

IMODEL:1 (1) SURF OR BURIED SOURCE; (2)POND SOURCE; (3) TABULATED SOURCE FUNCTION

>>> INPUT DATA

\*\*\*\*\*

|  |          |
|--|----------|
| NUMBER OF RADIOACTIVE PROGENY                | 0        |
| LENGTH OF SOURCE PARALLEL TO GW FLOW (m)     | 3.00E+02 |
| WIDTH OF SOURCE PERPENDICULAR TO GW FLOW (m) | 1.90E+02 |
| THICKNESS OF SOURCE (m)                      | 3.00E+00 |
| PERCOLATION RATE (darcy vel m/y)             | 1.00E-01 |
| VOLUMETRIC WATER CONTENT IN SOURCE           | 3.40E-01 |
| VOLUMETRIC WATER CONTENT IN UNSATURATED ZONE | 3.40E-01 |
| BULK DENSITY AT SOURCE (g/cm**3)             | 1.50E+00 |
| SORPTION COEFFICIENT AT SOURCE (ml/g)        | 1.62E-01 |
| BULK DENSITY IN UNSAT ZONE (g/cm**3)         | 1.50E+00 |
| UNSATURATED ZONE THICKNESS (m)               | 1.60E+01 |

|  |          |
|--|----------|
| SORPTION COEFFICIENT IN UNSAT ZONE (ml/g)      | 1.62E-01 |
| OPTIONAL LOSS RATE CONSTANT FOR SOURCE (y**-1) | 0.00E+00 |
| INITIAL MASS OR ACTIVITY (mg or Ci)            | 7.70E+05 |
| MOLECULAR WEIGHT (g/mole)                      | 1.00E+01 |
| SOLUBILITY LIMIT (mg/L)                        | 2.94E+03 |
| HALF-LIFE(S) OF CONTAMINANT AND PROGENY (y)    | 1.00E+38 |
| BULK DENSITY OF AQUIFER (g/cm**3)              | 1.90E+00 |
| POROSITY OF AQUIFER                            | 1.00E-01 |
| SORPTION COEFFICIENT(S) IN AQUIFER (ml/g)      | 0.00E+00 |
| DISPERSIVITY X DIRECTION (m)                   | 9.00E+00 |
| DISPERSIVITY Y DIRECTION (m)                   | 4.00E+00 |
| PORE VELOCITY (m/y)                            | 5.70E+02 |
| WELL SCREEN THICKNESS (m)                      | 1.50E+01 |
| DISTANCE TO RECEPTOR ALONG X AXIS (m)          | 1.50E+02 |
| DISTANCE TO RECEPTOR ALONG Y AXIS (m)          | 0.00E+00 |
| LIMITING CONTAMINANT GW CONCENTRATION (mg/L)   | 3.00E-02 |
| UNITS OF CONTAMINANT                           | mg       |

INPUT DATA FILE CREATED BY: *S. Sandhu* DATE 8/22/94

INPUT DATA CHECKED BY: *John O. Magnus* DATE 8/22/94

#### LIMITING SOIL CONCENTRATION CALCULATION

>>> VALUES CALCULATED IN SOURCE SUBROUTINE

\*\*\*\*\*

|   |            |
|---|------------|
| LEACH RATE CONSTANT (1/y)               | 5.7176E-02 |
| UNSATURATED PORE VELOCITY (m/y)         | 2.9412E-01 |
| DECAY CONSTANT(S) (1/y)                 | 0.0000E+00 |
| RETARDATION FACTOR(S) (SATURATED)       | 1.0000E+00 |
| RETARDATION FACTOR (UNSATURATED)        | 1.7147E+00 |
| SOLUBILITY LIMITED MASS (mg)            | 2.9310E+11 |
| SOLUBILITY LIMITED ACTIVITY (Ci)        | 0.0000E+00 |
| TRANSIT TIME IN UNSAT ZONE (years)      | 9.3280E+01 |
| FRACTION DECAYED DURING UNSAT TRANSPORT | 0.0000E+00 |

>>> EXPOSURE DATA FOR LIMITING SOIL CONCENTRATION

\*\*\*\*\*

|                                 |           |
|---------------------------------|-----------|
| INTEGRATION TIME (years)        | 1         |
| BODY WEIGHT (kg)                | 7.000E+01 |
| AVERAGING TIME (days)           | 2.555E+04 |
| WATER INTAKE RATE (L/d)         | 2.000E+00 |
| EXPOSURE FREQUENCY (days/year)  | 3.500E+02 |
| EXPOSURE DURATION (years)       | 7.000E+01 |
| RADIOLOGICAL DOSE LIMIT (rem/y) | 4.000E-03 |
| CARCINOGENIC RISK CRITERIA      | 1.000E-06 |
| HAZARD QUOTIENT                 | 1.000E+00 |

>>> RESULTS OF CALCULATIONS

\*\*\*\*\*

#### MAXIMUM NON RADIOLOGICAL CONTAMINANT CALCULATION

|  |               |
|--|---------------|
| MAXIMUM CONCENTRATION                  | 2.57E-04 mg/L |
| AVERAGE CONCENTRATION                  | 2.57E-04 mg/L |
| PEAK TIME (y):                         | 9.410554E+01  |
| LIMITING SOIL CONCENTRATION (mg/m**3): | 5.264E+02     |
| LIMITING SOIL CONCENTRATION (mg/kg):   | 3.509E-01     |
| LIMITING INVENTORY IN SOIL (mg):       | 9.001E+07     |
| EXECUTION TIME (seconds)               | 4             |

## CFA Landfill II - acetone

TIME OF RUN 19:46:06.9  
DATE OF RUN 08/05/94  
INPUT FILE NAME: acetone.inp  
OUTPUT FILE NAME: acetone.out

### ACKNOWLEDGEMENT OF GOVERNMENT SPONSORSHIP AND LIMITATION OF LIABILITY

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```
*****
*                                     *
*   This output was produced by the model:   *
*                                     *
*               GWSCREEN               *
*   Version Control Copy, Version 2.02   *
*   A semi-analytical model for the assessment *
*   of the groundwater pathway from the leaching *
*   of surficial and buried contamination and *
*   release of contaminants from percolation ponds *
*               10-11-93               *
*               Arthur S. Rood          *
*   Idaho National Engineering Laboratory *
*               EG&G Idaho Inc.         *
*   Subsurface and Environmental Modeling Unit *
*               PO Box 1625             *
*               Idaho Falls, Idaho 83415 *
*****
```

>>> TITLE OF PROJECT:  
CFA Landfill II - acetone

### GAUSSIAN QUADRATURE SOLUTION

#### MODEL OPTIONS

IMODE: 4

KFLAG: 1 (0)CONC VS TIME; (1)PEAK CONC AND LIMITING SOIL CONC

IMODEL:1 (1) SURF OR BURIED SOURCE; (2)POND SOURCE; (3) TABULATED SOURCE FUNCTION

#### >>> INPUT DATA

```
*****
NUMBER OF RADIOACTIVE PROGENY          0
LENGTH OF SOURCE PARALLEL TO GW FLOW (m)  3.00E+02
WIDTH OF SOURCE PERPENDICULAR TO GW FLOW (m)  1.90E+02
THICKNESS OF SOURCE (m)                 3.00E+00
PERCOLATION RATE (darcy vel m/y)        1.00E-01
VOLUMETRIC WATER CONTENT IN SOURCE      3.40E-01
VOLUMETRIC WATER CONTENT IN UNSATURATED ZONE  3.40E-01
BULK DENSITY AT SOURCE (g/cm**3)        1.50E+00
SORPTION COEFFICIENT AT SOURCE (ml/g)    6.60E-03
BULK DENSITY IN UNSAT ZONE (g/cm**3)    1.50E+00
UNSATURATED ZONE THICKNESS (m)          1.60E+01
```

|  |          |
|--|----------|
| SORPTION COEFFICIENT IN UNSAT ZONE (ml/g)      | 6.60E-03 |
| OPTIONAL LOSS RATE CONSTANT FOR SOURCE (y**-1) | 0.00E+00 |
| INITIAL MASS OR ACTIVITY (mg or Ci)            | 1.44E+09 |
| MOLECULAR WEIGHT (g/mole)                      | 1.00E+01 |
| SOLUBILITY LIMIT (mg/L)                        | 1.00E+10 |
| HALF-LIFE(S) OF CONTAMINANT AND PROGENY (y)    | 1.00E+38 |
| BULK DENSITY OF AQUIFER (g/cm**3)              | 1.90E+00 |
| POROSITY OF AQUIFER                            | 1.00E-01 |
| SORPTION COEFFICIENT(S) IN AQUIFER (ml/g)      | 0.00E+00 |
| DISPERSIVITY X DIRECTION (m)                   | 9.00E+00 |
| DISPERSIVITY Y DIRECTION (m)                   | 4.00E+00 |
| PORE VELOCITY (m/y)                            | 5.70E+02 |
| WELL SCREEN THICKNESS (m)                      | 1.50E+01 |
| DISTANCE TO RECEPTOR ALONG X AXIS (m)          | 1.50E+02 |
| DISTANCE TO RECEPTOR ALONG Y AXIS (m)          | 0.00E+00 |
| LIMITING CONTAMINANT GW CONCENTRATION (mg/L)   | 4.00E+00 |
| UNITS OF CONTAMINANT                           | mg       |

INPUT DATA FILE CREATED BY: *AS Sandberg* DATE 8/22/94

INPUT DATA CHECKED BY: *John O. Magnus* DATE 8/22/94

#### LIMITING SOIL CONCENTRATION CALCULATION

>>> VALUES CALCULATED IN SOURCE SUBROUTINE

\*\*\*\*\*

|   |            |
|---|------------|
| LEACH RATE CONSTANT (1/y)               | 9.5265E-02 |
| UNSATURATED PORE VELOCITY (m/y)         | 2.9412E-01 |
| DECAY CONSTANT(S) (1/y)                 | 0.0000E+00 |
| RETARDATION FACTOR(S) (SATURATED)       | 1.0000E+00 |
| RETARDATION FACTOR (UNSATURATED)        | 1.0291E+00 |
| SOLUBILITY LIMITED MASS (mg)            | 5.9833E+17 |
| SOLUBILITY LIMITED ACTIVITY (Ci)        | 0.0000E+00 |
| TRANSIT TIME IN UNSAT ZONE (years)      | 5.5984E+01 |
| FRACTION DECAYED DURING UNSAT TRANSPORT | 0.0000E+00 |

>>> EXPOSURE DATA FOR LIMITING SOIL CONCENTRATION

\*\*\*\*\*

|                                 |           |
|---------------------------------|-----------|
| INTEGRATION TIME (years)        | 1         |
| BODY WEIGHT (kg)                | 7.000E+01 |
| AVERAGING TIME (days)           | 2.555E+04 |
| WATER INTAKE RATE (L/d)         | 2.000E+00 |
| EXPOSURE FREQUENCY (days/year)  | 3.500E+02 |
| EXPOSURE DURATION (years)       | 7.000E+01 |
| RADIOLOGICAL DOSE LIMIT (rem/y) | 4.000E-03 |
| CARCINOGENIC RISK CRITERIA      | 1.000E-06 |
| HAZARD QUOTIENT                 | 1.000E+00 |

>>> RESULTS OF CALCULATIONS

\*\*\*\*\*

#### MAXIMUM NON RADIOLOGICAL CONTAMINANT CALCULATION

|  |               |
|--|---------------|
| MAXIMUM CONCENTRATION                  | 7.84E-01 mg/L |
| AVERAGE CONCENTRATION                  | 7.84E-01 mg/L |
| PEAK TIME (y):                         | 5.676309E+01  |
| LIMITING SOIL CONCENTRATION (mg/m**3): | 4.295E+04     |
| LIMITING SOIL CONCENTRATION (mg/kg):   | 2.864E+01     |
| LIMITING INVENTORY IN SOIL (mg):       | 7.345E+09     |
| EXECUTION TIME (seconds)               | 4             |



## CFA Landfill II - 2-butanone

TIME OF RUN 19:45:46.7  
DATE OF RUN 08/05/94  
INPUT FILE NAME: 2-butano.inp  
OUTPUT FILE NAME: 2-butano.out

=====

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=====

\*\*\*\*\*  
\* \* \* \* \*  
\* This output was produced by the model: \*  
\* \* \* \* \*  
\* GWSCREEN \*  
\* Version Control Copy, Version 2.02 \*  
\* A semi-analytical model for the assessment \*  
\* of the groundwater pathway from the leaching \*  
\* of surficial and buried contamination and \*  
\* release of contaminants from percolation ponds \*  
\* 10-11-93 \*  
\* Arthur S. Rood \*  
\* Idaho National Engineering Laboratory \*  
\* EG&G Idaho Inc. \*  
\* Subsurface and Environmental Modeling Unit \*  
\* PO Box 1625 \*  
\* Idaho Falls, Idaho 83415 \*  
\*\*\*\*\*

>>> TITLE OF PROJECT:  
CFA Landfill II - 2-butanone (MEK)

=====

### GAUSSIAN QUADRATURE SOLUTION

#### MODEL OPTIONS

IMODE: 4

KFLAG: 1 (0)CONC VS TIME; (1)PEAK CONC AND LIMITING SOIL CONC

IMODEL:1 (1) SURF OR BURIED SOURCE; (2)POND SOURCE; (3) TABULATED SOURCE FUNCTION

#### >>> INPUT DATA

\*\*\*\*\*

|  |          |
|--|----------|
| NUMBER OF RADIOACTIVE PROGENY                | 0        |
| LENGTH OF SOURCE PARALLEL TO GW FLOW (m)     | 3.00E+02 |
| WIDTH OF SOURCE PERPENDICULAR TO GW FLOW (m) | 1.90E+02 |
| THICKNESS OF SOURCE (m)                      | 3.00E+00 |
| PERCOLATION RATE (darcy vel m/y)             | 1.00E-01 |
| VOLUMETRIC WATER CONTENT IN SOURCE           | 3.40E-01 |
| VOLUMETRIC WATER CONTENT IN UNSATURATED ZONE | 3.40E-01 |
| BULK DENSITY AT SOURCE (g/cm**3)             | 1.50E+00 |
| SORPTION COEFFICIENT AT SOURCE (ml/g)        | 1.35E-02 |
| BULK DENSITY IN UNSAT ZONE (g/cm**3)         | 1.50E+00 |
| UNSATURATED ZONE THICKNESS (m)               | 1.60E+01 |

|   |          |
|---|----------|
| SORPTION COEFFICIENT IN UNSAT ZONE (ml/g)                   | 1.35E-02 |
| OPTIONAL LOSS RATE CONSTANT FOR SOURCE (y** <sup>-1</sup> ) | 0.00E+00 |
| INITIAL MASS OR ACTIVITY (mg or Ci)                         | 7.70E+08 |
| MOLECULAR WEIGHT (g/mole)                                   | 1.00E+01 |
| SOLUBILITY LIMIT (mg/L)                                     | 2.68E+05 |
| HALF-LIFE(S) OF CONTAMINANT AND PROGENY (y)                 | 1.00E+38 |
| BULK DENSITY OF AQUIFER (g/cm**3)                           | 1.90E+00 |
| POROSITY OF AQUIFER   | 1.00E-01 |
| SORPTION COEFFICIENT(S) IN AQUIFER (ml/g)                   | 0.00E+00 |
| DISPERSIVITY X DIRECTION (m)                                | 9.00E+00 |
| DISPERSIVITY Y DIRECTION (m)                                | 4.00E+00 |
| PORE VELOCITY (m/y)   | 5.70E+02 |
| WELL SCREEN THICKNESS (m)                                   | 1.50E+01 |
| DISTANCE TO RECEPTOR ALONG X AXIS (m)                       | 1.50E+02 |
| DISTANCE TO RECEPTOR ALONG Y AXIS (m)                       | 0.00E+00 |
| LIMITING CONTAMINANT GW CONCENTRATION (mg/L)                | 1.00E+00 |
| UNITS OF CONTAMINANT  | mg       |

INPUT DATA FILE CREATED BY: *Sandhu* DATE 8/22/94

INPUT DATA CHECKED BY: *John O. Meyers* DATE 8/22/94

#### LIMITING SOIL CONCENTRATION CALCULATION

>>> VALUES CALCULATED IN SOURCE SUBROUTINE

\*\*\*\*\*

|   |            |
|---|------------|
| LEACH RATE CONSTANT (1/y)               | 9.2528E-02 |
| UNSATURATED PORE VELOCITY (m/y)         | 2.9412E-01 |
| DECAY CONSTANT(S) (1/y)                 | 0.0000E+00 |
| RETARDATION FACTOR(S) (SATURATED)       | 1.0000E+00 |
| RETARDATION FACTOR (UNSATURATED)        | 1.0596E+00 |
| SOLUBILITY LIMITED MASS (mg)            | 1.6510E+13 |
| SOLUBILITY LIMITED ACTIVITY (Ci)        | 0.0000E+00 |
| TRANSIT TIME IN UNSAT ZONE (years)      | 5.7640E+01 |
| FRACTION DECAYED DURING UNSAT TRANSPORT | 0.0000E+00 |

>>> EXPOSURE DATA FOR LIMITING SOIL CONCENTRATION

\*\*\*\*\*

|                                 |           |
|---------------------------------|-----------|
| INTEGRATION TIME (years)        | 1         |
| BODY WEIGHT (kg)                | 7.000E+01 |
| AVERAGING TIME (days)           | 2.555E+04 |
| WATER INTAKE RATE (L/d)         | 2.000E+00 |
| EXPOSURE FREQUENCY (days/year)  | 3.500E+02 |
| EXPOSURE DURATION (years)       | 7.000E+01 |
| RADIOLOGICAL DOSE LIMIT (rem/y) | 4.000E-03 |
| CARCINOGENIC RISK CRITERIA      | 1.000E-06 |
| HAZARD QUOTIENT                 | 1.000E+00 |

>>> RESULTS OF CALCULATIONS

\*\*\*\*\*

#### MAXIMUM NON RADIOLOGICAL CONTAMINANT CALCULATION

|  |               |
|--|---------------|
| MAXIMUM CONCENTRATION                  | 4.08E-01 mg/L |
| AVERAGE CONCENTRATION                  | 4.08E-01 mg/L |
| PEAK TIME (y):                         | 5.842493E+01  |
| LIMITING SOIL CONCENTRATION (mg/m**3): | 1.104E+04     |
| LIMITING SOIL CONCENTRATION (mg/kg):   | 7.361E+00     |
| LIMITING INVENTORY IN SOIL (mg):       | 1.888E+09     |
| EXECUTION TIME (seconds)               | 4             |

## CFA Landfill II - 1,1-dichloroethane

TIME OF RUN 19:45:27.0  
DATE OF RUN 08/05/94  
INPUT FILE NAME: 11-dich1.inp  
OUTPUT FILE NAME: 11-dich1.out

### ACKNOWLEDGEMENT OF GOVERNMENT SPONSORSHIP AND LIMITATION OF LIABILITY

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```
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*   This output was produced by the model:   *
*                                     *
*           GWSCREEN                     *
*   Version Control Copy, Version 2.02      *
*   A semi-analytical model for the assessment *
*   of the groundwater pathway from the leaching *
*   of surficial and buried contamination and *
*   release of contaminants from percolation ponds *
*   10-11-93                               *
*   Arthur S. Rood                          *
*   Idaho National Engineering Laboratory    *
*   EG&G Idaho Inc.                        *
*   Subsurface and Environmental Modeling Unit *
*   PO Box 1625                             *
*   Idaho Falls, Idaho 83415                *
*****
```

>>> TITLE OF PROJECT:  
CFA Landfill II - 1,1 dichloroethane

### GAUSSIAN QUADRATURE SOLUTION

#### MODEL OPTIONS

IMODE: 4

KFLAG: 1 (0)CONC VS TIME; (1)PEAK CONC AND LIMITING SOIL CONC

IMODEL:1 (1) SURF OR BURIED SOURCE; (2)POND SOURCE; (3) TABULATED SOURCE FUNCTION

#### >>> INPUT DATA

```
*****
NUMBER OF RADIOACTIVE PROGENY          0
LENGTH OF SOURCE PARALLEL TO GW FLOW (m)  3.00E+02
WIDTH OF SOURCE PERPENDICULAR TO GW FLOW (m)  1.90E+02
THICKNESS OF SOURCE (m)                3.00E+00
PERCOLATION RATE (darcy vel m/y)        1.00E-01
VOLUMETRIC WATER CONTENT IN SOURCE      3.40E-01
VOLUMETRIC WATER CONTENT IN UNSATURATED ZONE 3.40E-01
BULK DENSITY AT SOURCE (g/cm**3)        1.50E+00
SORPTION COEFFICIENT AT SOURCE (ml/g)    9.00E-02
BULK DENSITY IN UNSAT ZONE (g/cm**3)     1.50E+00
UNSATURATED ZONE THICKNESS (m)          1.60E+01
```

|  |          |
|--|----------|
| SORPTION COEFFICIENT IN UNSAT ZONE (ml/g)      | 9.00E-02 |
| OPTIONAL LOSS RATE CONSTANT FOR SOURCE (y**-1) | 0.00E+00 |
| INITIAL MASS OR ACTIVITY (mg or Ci)            | 6.41E+06 |
| MOLECULAR WEIGHT (g/mole)                      | 1.00E+01 |
| SOLUBILITY LIMIT (mg/L)                        | 5.50E+03 |
| HALF-LIFE(S) OF CONTAMINANT AND PROGENY (y)    | 1.00E+38 |
| BULK DENSITY OF AQUIFER (g/cm**3)              | 1.90E+00 |
| POROSITY OF AQUIFER                            | 1.00E-01 |
| SORPTION COEFFICIENT(S) IN AQUIFER (ml/g)      | 0.00E+00 |
| DISPERSIVITY X DIRECTION (m)                   | 9.00E+00 |
| DISPERSIVITY Y DIRECTION (m)                   | 4.00E+00 |
| PORE VELOCITY (m/y)                            | 5.70E+02 |
| WELL SCREEN THICKNESS (m)                      | 1.50E+01 |
| DISTANCE TO RECEPTOR ALONG X AXIS (m)          | 1.50E+02 |
| DISTANCE TO RECEPTOR ALONG Y AXIS (m)          | 0.00E+00 |
| LIMITING CONTAMINANT GW CONCENTRATION (mg/L)   | 1.00E+00 |
| UNITS OF CONTAMINANT                           | mg       |

INPUT DATA FILE CREATED BY AS Sandberg DATE 8/22/94

INPUT DATA CHECKED BY: John O. Mayner DATE 8/22/94

#### LIMITING SOIL CONCENTRATION CALCULATION

>>> VALUES CALCULATED IN SOURCE SUBROUTINE

\*\*\*\*\*

|   |            |
|---|------------|
| LEACH RATE CONSTANT (1/y)               | 7.0175E-02 |
| UNSATURATED PORE VELOCITY (m/y)         | 2.9412E-01 |
| DECAY CONSTANT(S) (1/y)                 | 0.0000E+00 |
| RETARDATION FACTOR(S) (SATURATED)       | 1.0000E+00 |
| RETARDATION FACTOR (UNSATURATED)        | 1.3971E+00 |
| SOLUBILITY LIMITED MASS (mg)            | 4.4674E+11 |
| SOLUBILITY LIMITED ACTIVITY (Ci)        | 0.0000E+00 |
| TRANSIT TIME IN UNSAT ZONE (years)      | 7.6000E+01 |
| FRACTION DECAYED DURING UNSAT TRANSPORT | 0.0000E+00 |

>>> EXPOSURE DATA FOR LIMITING SOIL CONCENTRATION

\*\*\*\*\*

|                                 |           |
|---------------------------------|-----------|
| INTEGRATION TIME (years)        | 1         |
| BODY WEIGHT (kg)                | 7.000E+01 |
| AVERAGING TIME (days)           | 2.555E+04 |
| WATER INTAKE RATE (L/d)         | 2.000E+00 |
| EXPOSURE FREQUENCY (days/year)  | 3.500E+02 |
| EXPOSURE DURATION (years)       | 7.000E+01 |
| RADIOLOGICAL DOSE LIMIT (rem/y) | 4.000E-03 |
| CARCINOGENIC RISK CRITERIA      | 1.000E-06 |
| HAZARD QUOTIENT                 | 1.000E+00 |

>>> RESULTS OF CALCULATIONS

\*\*\*\*\*

#### MAXIMUM NON RADIOLOGICAL CONTAMINANT CALCULATION

|  |               |
|--|---------------|
| MAXIMUM CONCENTRATION                  | 2.60E-03 mg/L |
| AVERAGE CONCENTRATION                  | 2.60E-03 mg/L |
| PEAK TIME (y):                         | 7.680873E+01  |
| LIMITING SOIL CONCENTRATION (mg/m**3): | 1.439E+04     |
| LIMITING SOIL CONCENTRATION (mg/kg):   | 9.596E+00     |
| LIMITING INVENTORY IN SOIL (mg):       | 2.461E+09     |
| EXECUTION TIME (seconds)               | 4             |

## CFA Landfill II - 1,2-dichloroethene

TIME OF RUN 19:45:39.9

DATE OF RUN 08/05/94

INPUT FILE NAME: 12-dich1.inp

OUTPUT FILE NAME: 12-dich1.out

### ACKNOWLEDGEMENT OF GOVERNMENT SPONSORSHIP AND LIMITATION OF LIABILITY

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```
*****
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*   This output was produced by the model:
*
*           GWSCREEN
*   Version Control Copy, Version 2.02
*   A semi-analytical model for the assessment
*   of the groundwater pathway from the leaching
*   of surficial and buried contamination and
*   release of contaminants from percolation ponds
*   10-11-93
*   Arthur S. Rood
*   Idaho National Engineering Laboratory
*   EG&G Idaho Inc.
*   Subsurface and Environmental Modeling Unit
*   PO Box 1625
*   Idaho Falls, Idaho 83415
*****
```

>>> TITLE OF PROJECT:

CFA Landfill II - 1,2 dichloroethene

### GAUSSIAN QUADRATURE SOLUTION

#### MODEL OPTIONS

IMODE: 4

KFLAG: 1 (0)CONC VS TIME; (1)PEAK CONC AND LIMITING SOIL CONC

IMODEL:1 (1) SURF OR BURIED SOURCE; (2)POND SOURCE; (3) TABULATED SOURCE FUNCTION

>>> INPUT DATA

```
*****
NUMBER OF RADIOACTIVE PROGENY          0
LENGTH OF SOURCE PARALLEL TO GW FLOW (m)  3.00E+02
WIDTH OF SOURCE PERPENDICULAR TO GW FLOW (m)  1.90E+02
THICKNESS OF SOURCE (m)                3.00E+00
PERCOLATION RATE (darcy vel m/y)        1.00E-01
VOLUMETRIC WATER CONTENT IN SOURCE      3.40E-01
VOLUMETRIC WATER CONTENT IN UNSATURATED ZONE  3.40E-01
BULK DENSITY AT SOURCE (g/cm**3)        1.50E+00
SORPTION COEFFICIENT AT SOURCE (ml/g)    1.47E-01
BULK DENSITY IN UNSAT ZONE (g/cm**3)     1.50E+00
UNSATURATED ZONE THICKNESS (m)          1.60E+01
```

|   |          |
|---|----------|
| SORPTION COEFFICIENT IN UNSAT ZONE (ml/g)                   | 1.47E-01 |
| OPTIONAL LOSS RATE CONSTANT FOR SOURCE (y** <sup>-1</sup> ) | 0.00E+00 |
| INITIAL MASS OR ACTIVITY (mg or Ci)                         | 3.85E+06 |
| MOLECULAR WEIGHT (g/mole)                                   | 1.00E+01 |
| SOLUBILITY LIMIT (mg/L)                                     | 3.50E+03 |
| HALF-LIFE(S) OF CONTAMINANT AND PROGENY (y)                 | 1.00E+38 |
| BULK DENSITY OF AQUIFER (g/cm**3)                           | 1.90E+00 |
| POROSITY OF AQUIFER   | 1.00E-01 |
| SORPTION COEFFICIENT(S) IN AQUIFER (ml/g)                   | 0.00E+00 |
| DISPERSIVITY X DIRECTION (m)                                | 9.00E+00 |
| DISPERSIVITY Y DIRECTION (m)                                | 4.00E+00 |
| PORE VELOCITY (m/y)   | 5.70E+02 |
| WELL SCREEN THICKNESS (m)                                   | 1.50E+01 |
| DISTANCE TO RECEPTOR ALONG X AXIS (m)                       | 1.50E+02 |
| DISTANCE TO RECEPTOR ALONG Y AXIS (m)                       | 0.00E+00 |
| LIMITING CONTAMINANT GW CONCENTRATION (mg/L)                | 4.00E-01 |
| UNITS OF CONTAMINANT  | mg       |

INPUT DATA FILE CREATED BY: Sondum DATE 8/22/94

INPUT DATA CHECKED BY: Jim O. Meyers DATE 8/22/94

-----  
LIMITING SOIL CONCENTRATION CALCULATION

>>> VALUES CALCULATED IN SOURCE SUBROUTINE

\*\*\*\*\*

|   |            |
|---|------------|
| LEACH RATE CONSTANT (1/y)               | 5.9471E-02 |
| UNSATURATED PORE VELOCITY (m/y)         | 2.9412E-01 |
| DECAY CONSTANT(S) (1/y)                 | 0.0000E+00 |
| RETARDATION FACTOR(S) (SATURATED)       | 1.0000E+00 |
| RETARDATION FACTOR (UNSATURATED)        | 1.6485E+00 |
| SOLUBILITY LIMITED MASS (mg)            | 3.3546E+11 |
| SOLUBILITY LIMITED ACTIVITY (Ci)        | 0.0000E+00 |
| TRANSIT TIME IN UNSAT ZONE (years)      | 8.9680E+01 |
| FRACTION DECAYED DURING UNSAT TRANSPORT | 0.0000E+00 |

>>> EXPOSURE DATA FOR LIMITING SOIL CONCENTRATION

\*\*\*\*\*

|                                 |           |
|---------------------------------|-----------|
| INTEGRATION TIME (years)        | 1         |
| BODY WEIGHT (kg)                | 7.000E+01 |
| AVERAGING TIME (days)           | 2.555E+04 |
| WATER INTAKE RATE (L/d)         | 2.000E+00 |
| EXPOSURE FREQUENCY (days/year)  | 3.500E+02 |
| EXPOSURE DURATION (years)       | 7.000E+01 |
| RADIOLOGICAL DOSE LIMIT (rem/y) | 4.000E-03 |
| CARCINOGENIC RISK CRITERIA      | 1.000E-06 |
| HAZARD QUOTIENT                 | 1.000E+00 |

>>> RESULTS OF CALCULATIONS

\*\*\*\*\*

MAXIMUM NON RADIOLOGICAL CONTAMINANT CALCULATION

|  |               |
|--|---------------|
| MAXIMUM CONCENTRATION                  | 1.33E-03 mg/L |
| AVERAGE CONCENTRATION                  | 1.33E-03 mg/L |
| PEAK TIME (y):                         | 9.049912E+01  |
| LIMITING SOIL CONCENTRATION (mg/m**3): | 6.756E+03     |
| LIMITING SOIL CONCENTRATION (mg/kg):   | 4.504E+00     |
| LIMITING INVENTORY IN SOIL (mg):       | 1.155E+09     |
| EXECUTION TIME (seconds)               | 4             |

## CFA Landfill II - methylene chloride

TIME OF RUN 19:46:27.0

DATE OF RUN 08/05/94

INPUT FILE NAME: methylen.inp

OUTPUT FILE NAME: methylen.out

### ACKNOWLEDGEMENT OF GOVERNMENT SPONSORSHIP AND LIMITATION OF LIABILITY

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```
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*
*   This output was produced by the model:
*
*           GWSCREEN
*   Version Control Copy, Version 2.02
*   A semi-analytical model for the assessment
*   of the groundwater pathway from the leaching
*   of surficial and buried contamination and
*   release of contaminants from percolation ponds
*   10-11-93
*   Arthur S. Rood
*   Idaho National Engineering Laboratory
*   EG&G Idaho Inc.
*   Subsurface and Environmental Modeling Unit
*   PO Box 1625
*   Idaho Falls, Idaho 83415
*****
```

>>> TITLE OF PROJECT:

CFA Landfill II - methylene chloride

### GAUSSIAN QUADRATURE SOLUTION

#### MODEL OPTIONS

IMODE: 4

KFLAG: 1 (0)CONC VS TIME; (1)PEAK CONC AND LIMITING SOIL CONC

IMODEL:1 (1) SURF OR BURIED SOURCE; (2)POND SOURCE; (3) TABULATED SOURCE FUNCTION

>>> INPUT DATA

```
*****
NUMBER OF RADIOACTIVE PROGENY          0
LENGTH OF SOURCE PARALLEL TO GW FLOW (m) 3.00E+02
WIDTH OF SOURCE PERPENDICULAR TO GW FLOW (m) 1.90E+02
THICKNESS OF SOURCE (m) 3.00E+00
PERCOLATION RATE (darcy vel m/y) 1.00E-01
VOLUMETRIC WATER CONTENT IN SOURCE 3.40E-01
VOLUMETRIC WATER CONTENT IN UNSATURATED ZONE 3.40E-01
BULK DENSITY AT SOURCE (g/cm**3) 1.50E+00
SORPTION COEFFICIENT AT SOURCE (ml/g) 2.64E-02
BULK DENSITY IN UNSAT ZONE (g/cm**3) 1.50E+00
UNSATURATED ZONE THICKNESS (m) 1.60E+01
```

|  |          |
|--|----------|
| SORPTION COEFFICIENT IN UNSAT ZONE (ml/g)      | 2.64E-02 |
| OPTIONAL LOSS RATE CONSTANT FOR SOURCE (y**-1) | 0.00E+00 |
| INITIAL MASS OR ACTIVITY (mg or Ci)            | 1.90E+07 |
| MOLECULAR WEIGHT (g/mole)                      | 1.00E+01 |
| SOLUBILITY LIMIT (mg/L)                        | 2.00E+04 |
| HALF-LIFE(S) OF CONTAMINANT AND PROGENY (y)    | 1.00E+38 |
| BULK DENSITY OF AQUIFER (g/cm**3)              | 1.90E+00 |
| POROSITY OF AQUIFER                            | 1.00E-01 |
| SORPTION COEFFICIENT(S) IN AQUIFER (ml/g)      | 0.00E+00 |
| DISPERSIVITY X DIRECTION (m)                   | 9.00E+00 |
| DISPERSIVITY Y DIRECTION (m)                   | 4.00E+00 |
| PORE VELOCITY (m/y)                            | 5.70E+02 |
| WELL SCREEN THICKNESS (m)                      | 1.50E+01 |
| DISTANCE TO RECEPTOR ALONG X AXIS (m)          | 1.50E+02 |
| DISTANCE TO RECEPTOR ALONG Y AXIS (m)          | 0.00E+00 |
| LIMITING CONTAMINANT GW CONCENTRATION (mg/L)   | 7.00E-03 |
| UNITS OF CONTAMINANT                           | mg       |

INPUT DATA FILE CREATED BY: Sondump DATE 8/22/94

INPUT DATA CHECKED BY: Don O. Magnus DATE 8/22/94

-----  
LIMITING SOIL CONCENTRATION CALCULATION

>>> VALUES CALCULATED IN SOURCE SUBROUTINE

\*\*\*\*\*

|   |            |
|---|------------|
| LEACH RATE CONSTANT (1/y)               | 8.7812E-02 |
| UNSATURATED PORE VELOCITY (m/y)         | 2.9412E-01 |
| DECAY CONSTANT(S) (1/y)                 | 0.0000E+00 |
| RETARDATION FACTOR(S) (SATURATED)       | 1.0000E+00 |
| RETARDATION FACTOR (UNSATURATED)        | 1.1165E+00 |
| SOLUBILITY LIMITED MASS (mg)            | 1.2982E+12 |
| SOLUBILITY LIMITED ACTIVITY (Ci)        | 0.0000E+00 |
| TRANSIT TIME IN UNSAT ZONE (years)      | 6.0736E+01 |
| FRACTION DECAYED DURING UNSAT TRANSPORT | 0.0000E+00 |

-----  
>>> EXPOSURE DATA FOR LIMITING SOIL CONCENTRATION

\*\*\*\*\*

|                                 |           |
|---------------------------------|-----------|
| INTEGRATION TIME (years)        | 1         |
| BODY WEIGHT (kg)                | 7.000E+01 |
| AVERAGING TIME (days)           | 2.555E+04 |
| WATER INTAKE RATE (L/d)         | 2.000E+00 |
| EXPOSURE FREQUENCY (days/year)  | 3.500E+02 |
| EXPOSURE DURATION (years)       | 7.000E+01 |
| RADIOLOGICAL DOSE LIMIT (rem/y) | 4.000E-03 |
| CARCINOGENIC RISK CRITERIA      | 1.000E-06 |
| HAZARD QUOTIENT                 | 1.000E+00 |

-----  
>>> RESULTS OF CALCULATIONS

\*\*\*\*\*

MAXIMUM NON RADIOLOGICAL CONTAMINANT CALCULATION

|  |               |
|--|---------------|
| MAXIMUM CONCENTRATION                  | 9.57E-03 mg/L |
| AVERAGE CONCENTRATION                  | 9.57E-03 mg/L |
| PEAK TIME (y):                         | 6.152338E+01  |
| LIMITING SOIL CONCENTRATION (mg/m**3): | 8.125E+01     |
| LIMITING SOIL CONCENTRATION (mg/kg):   | 5.417E-02     |
| LIMITING INVENTORY IN SOIL (mg):       | 1.389E+07     |
| EXECUTION TIME (seconds)               | 4             |



## CFA Landfill II - 4-methyl 2-pentanone

TIME OF RUN 19:46:00.3

DATE OF RUN 08/05/94

INPUT FILE NAME: 4-methyl.inp

OUTPUT FILE NAME: 4-methyl.out

### ACKNOWLEDGEMENT OF GOVERNMENT SPONSORSHIP AND LIMITATION OF LIABILITY

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```
*****
*
*   This output was produced by the model:
*
*           GWSCREEN
*   Version Control Copy, Version 2.02
*   A semi-analytical model for the assessment
*   of the groundwater pathway from the leaching
*   of surficial and buried contamination and
*   release of contaminants from percolation ponds
*           10-11-93
*           Arthur S. Rood
*   Idaho National Engineering Laboratory
*           EG&G Idaho Inc.
*   Subsurface and Environmental Modeling Unit
*           PO Box 1625
*           Idaho Falls, Idaho 83415
*****
```

>>> TITLE OF PROJECT:

CFA Landfill II - 4-methyl 2-pentanone

### GAUSSIAN QUADRATURE SOLUTION

#### MODEL OPTIONS

IMODE: 4

KFLAG: 1 (0)CONC VS TIME; (1)PEAK CONC AND LIMITING SOIL CONC

IMODEL:1 (1) SURF OR BURIED SOURCE; (2)POND SOURCE; (3) TABULATED SOURCE FUNCTION

>>> INPUT DATA

```
*****
NUMBER OF RADIOACTIVE PROGENY          0
LENGTH OF SOURCE PARALLEL TO GW FLOW (m) 3.00E+02
WIDTH OF SOURCE PERPENDICULAR TO GW FLOW (m) 1.90E+02
THICKNESS OF SOURCE (m) 3.00E+00
PERCOLATION RATE (darcy vel m/y) 1.00E-01
VOLUMETRIC WATER CONTENT IN SOURCE 3.40E-01
VOLUMETRIC WATER CONTENT IN UNSATURATED ZONE 3.40E-01
BULK DENSITY AT SOURCE (g/cm**3) 1.50E+00
SORPTION COEFFICIENT AT SOURCE (ml/g) 6.18E-02
BULK DENSITY IN UNSAT ZONE (g/cm**3) 1.50E+00
UNSATURATED ZONE THICKNESS (m) 1.60E+01
```

|  |          |
|--|----------|
| SORPTION COEFFICIENT IN UNSAT ZONE (ml/g)      | 6.18E-02 |
| OPTIONAL LOSS RATE CONSTANT FOR SOURCE (y**-1) | 0.00E+00 |
| INITIAL MASS OR ACTIVITY (mg or Ci)            | 7.18E+07 |
| MOLECULAR WEIGHT (g/mole)                      | 1.00E+01 |
| SOLUBILITY LIMIT (mg/L)                        | 1.70E+04 |
| HALF-LIFE(S) OF CONTAMINANT AND PROGENY (y)    | 1.00E+38 |
| BULK DENSITY OF AQUIFER (g/cm**3)              | 1.90E+00 |
| POROSITY OF AQUIFER                            | 1.00E-01 |
| SORPTION COEFFICIENT(S) IN AQUIFER (ml/g)      | 0.00E+00 |
| DISPERSIVITY X DIRECTION (m)                   | 9.00E+00 |
| DISPERSIVITY Y DIRECTION (m)                   | 4.00E+00 |
| PORE VELOCITY (m/y)                            | 5.70E+02 |
| WELL SCREEN THICKNESS (m)                      | 1.50E+01 |
| DISTANCE TO RECEPTOR ALONG X AXIS (m)          | 1.50E+02 |
| DISTANCE TO RECEPTOR ALONG Y AXIS (m)          | 0.00E+00 |
| LIMITING CONTAMINANT GW CONCENTRATION (mg/L)   | 0.00E+00 |
| UNITS OF CONTAMINANT                           | mg       |

INPUT DATA FILE CREATED BY: *[Signature]* DATE 8/23/94

INPUT DATA CHECKED BY: *[Signature]* DATE 8/22/94

#### LIMITING SOIL CONCENTRATION CALCULATION

>>> VALUES CALCULATED IN SOURCE SUBROUTINE

\*\*\*\*\*

|   |            |
|---|------------|
| LEACH RATE CONSTANT (1/y)               | 7.7036E-02 |
| UNSATURATED PORE VELOCITY (m/y)         | 2.9412E-01 |
| DECAY CONSTANT(S) (1/y)                 | 0.0000E+00 |
| RETARDATION FACTOR(S) (SATURATED)       | 1.0000E+00 |
| RETARDATION FACTOR (UNSATURATED)        | 1.2726E+00 |
| SOLUBILITY LIMITED MASS (mg)            | 1.2579E+12 |
| SOLUBILITY LIMITED ACTIVITY (Ci)        | 0.0000E+00 |
| TRANSIT TIME IN UNSAT ZONE (years)      | 6.9232E+01 |
| FRACTION DECAYED DURING UNSAT TRANSPORT | 0.0000E+00 |

>>> EXPOSURE DATA FOR LIMITING SOIL CONCENTRATION

\*\*\*\*\*

|                                 |           |
|---------------------------------|-----------|
| INTEGRATION TIME (years)        | 1         |
| BODY WEIGHT (kg)                | 7.000E+01 |
| AVERAGING TIME (days)           | 2.555E+04 |
| WATER INTAKE RATE (L/d)         | 2.000E+00 |
| EXPOSURE FREQUENCY (days/year)  | 3.500E+02 |
| EXPOSURE DURATION (years)       | 7.000E+01 |
| RADIOLOGICAL DOSE LIMIT (rem/y) | 4.000E-03 |
| CARCINOGENIC RISK CRITERIA      | 1.000E-06 |
| HAZARD QUOTIENT                 | 1.000E+00 |

>>> RESULTS OF CALCULATIONS

\*\*\*\*\*

#### MAXIMUM NON RADIOLOGICAL CONTAMINANT CALCULATION

|  |               |
|--|---------------|
| MAXIMUM CONCENTRATION                  | 3.19E-02 mg/L |
| AVERAGE CONCENTRATION                  | 3.19E-02 mg/L |
| PEAK TIME (y):                         | 7.003128E+01  |
| LIMITING SOIL CONCENTRATION (mg/m**3): | 0.000E+00     |
| LIMITING SOIL CONCENTRATION (mg/kg):   | 0.000E+00     |
| LIMITING INVENTORY IN SOIL (mg):       | 0.000E+00     |
| EXECUTION TIME (seconds)               | 4             |

## CFA Landfill II - 1,1,1-trichloroethane

TIME OF RUN 19:45:33.2

DATE OF RUN 08/05/94

INPUT FILE NAME: 111-tric.inp

OUTPUT FILE NAME: 111-tric.out

### ACKNOWLEDGEMENT OF GOVERNMENT SPONSORSHIP AND LIMITATION OF LIABILITY

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```
*****
*                                     *
*   This output was produced by the model:   *
*                                     *
*               GWSCREEN               *
*   Version Control Copy, Version 2.02   *
*   A semi-analytical model for the assessment *
*   of the groundwater pathway from the leaching *
*   of surficial and buried contamination and *
*   release of contaminants from percolation ponds *
*   10-11-93                             *
*   Arthur S. Rood                         *
*   Idaho National Engineering Laboratory   *
*   EG&G Idaho Inc.                       *
*   Subsurface and Environmental Modeling Unit *
*   PO Box 1625                           *
*   Idaho Falls, Idaho 83415              *
*****
```

>>> TITLE OF PROJECT:  
CFA Landfill II - 1,1,1-trichloroethane

### GAUSSIAN QUADRATURE SOLUTION

#### MODEL OPTIONS

IMODE: 4

KFLAG: 1 (0)CONC VS TIME; (1)PEAK CONC AND LIMITING SOIL CONC

IMODEL:1 (1) SURF OR BURIED SOURCE; (2)POND SOURCE; (3) TABULATED SOURCE FUNCTION

#### >>> INPUT DATA

```
*****
NUMBER OF RADIOACTIVE PROGENY          0
LENGTH OF SOURCE PARALLEL TO GW FLOW (m)  3.00E+02
WIDTH OF SOURCE PERPENDICULAR TO GW FLOW (m)  1.90E+02
THICKNESS OF SOURCE (m)                3.00E+00
PERCOLATION RATE (darcy vel m/y)        1.00E-01
VOLUMETRIC WATER CONTENT IN SOURCE      3.40E-01
VOLUMETRIC WATER CONTENT IN UNSATURATED ZONE  3.40E-01
BULK DENSITY AT SOURCE (g/cm**3)        1.50E+00
SORPTION COEFFICIENT AT SOURCE (ml/g)    4.56E-01
BULK DENSITY IN UNSAT ZONE (g/cm**3)    1.50E+00
UNSATURATED ZONE THICKNESS (m)          1.60E+01
```

|  |          |
|--|----------|
| SORPTION COEFFICIENT IN UNSAT ZONE (ml/g)      | 4.56E-01 |
| OPTIONAL LOSS RATE CONSTANT FOR SOURCE (y**-1) | 0.00E+00 |
| INITIAL MASS OR ACTIVITY (mg or Ci)            | 1.28E+06 |
| MOLECULAR WEIGHT (g/mole)                      | 1.00E+01 |
| SOLUBILITY LIMIT (mg/L)                        | 1.50E+03 |
| HALF-LIFE(S) OF CONTAMINANT AND PROGENY (y)    | 1.00E+38 |
| BULK DENSITY OF AQUIFER (g/cm**3)              | 1.90E+00 |
| POROSITY OF AQUIFER                            | 1.00E-01 |
| SORPTION COEFFICIENT(S) IN AQUIFER (ml/g)      | 0.00E+00 |
| DISPERSIVITY X DIRECTION (m)                   | 9.00E+00 |
| DISPERSIVITY Y DIRECTION (m)                   | 4.00E+00 |
| PORE VELOCITY (m/y)                            | 5.70E+02 |
| WELL SCREEN THICKNESS (m)                      | 1.50E+01 |
| DISTANCE TO RECEPTOR ALONG X AXIS (m)          | 1.50E+02 |
| DISTANCE TO RECEPTOR ALONG Y AXIS (m)          | 0.00E+00 |
| LIMITING CONTAMINANT GW CONCENTRATION (mg/L)   | 2.00E+00 |
| UNITS OF CONTAMINANT                           | mg       |

INPUT DATA FILE CREATED BY: *J. Bondrup* DATE 8/22/94

INPUT DATA CHECKED BY: *John O. Magnus* DATE 8/22/94

#### LIMITING SOIL CONCENTRATION CALCULATION

>>> VALUES CALCULATED IN SOURCE SUBROUTINE

\*\*\*\*\*

|   |            |
|---|------------|
| LEACH RATE CONSTANT (1/y)               | 3.2552E-02 |
| UNSATURATED PORE VELOCITY (m/y)         | 2.9412E-01 |
| DECAY CONSTANT(S) (1/y)                 | 0.0000E+00 |
| RETARDATION FACTOR(S) (SATURATED)       | 1.0000E+00 |
| RETARDATION FACTOR (UNSATURATED)        | 3.0118E+00 |
| SOLUBILITY LIMITED MASS (mg)            | 2.6266E+11 |
| SOLUBILITY LIMITED ACTIVITY (Ci)        | 0.0000E+00 |
| TRANSIT TIME IN UNSAT ZONE (years)      | 1.6384E+02 |
| FRACTION DECAYED DURING UNSAT TRANSPORT | 0.0000E+00 |

>>> EXPOSURE DATA FOR LIMITING SOIL CONCENTRATION

\*\*\*\*\*

|                                 |           |
|---------------------------------|-----------|
| INTEGRATION TIME (years)        | 1         |
| BODY WEIGHT (kg)                | 7.000E+01 |
| AVERAGING TIME (days)           | 2.555E+04 |
| WATER INTAKE RATE (L/d)         | 2.000E+00 |
| EXPOSURE FREQUENCY (days/year)  | 3.500E+02 |
| EXPOSURE DURATION (years)       | 7.000E+01 |
| RADIOLOGICAL DOSE LIMIT (rem/y) | 4.000E-03 |
| CARCINOGENIC RISK CRITERIA      | 1.000E-06 |
| HAZARD QUOTIENT                 | 1.000E+00 |

>>> RESULTS OF CALCULATIONS

\*\*\*\*\*

#### MAXIMUM NON RADIOLOGICAL CONTAMINANT CALCULATION

|  |               |
|--|---------------|
| MAXIMUM CONCENTRATION                  | 2.46E-04 mg/L |
| AVERAGE CONCENTRATION                  | 2.46E-04 mg/L |
| PEAK TIME (y):                         | 1.647080E+02  |
| LIMITING SOIL CONCENTRATION (mg/m**3): | 6.080E+04     |
| LIMITING SOIL CONCENTRATION (mg/kg):   | 4.053E+01     |
| LIMITING INVENTORY IN SOIL (mg):       | 1.040E+10     |
| EXECUTION TIME (seconds)               | 4             |

## CFA Landfill II - 2-hexanone

TIME OF RUN 19:45:53.6

DATE OF RUN 08/05/94

INPUT FILE NAME: 2-hexano.inp

OUTPUT FILE NAME: 2-hexano.out

### ACKNOWLEDGEMENT OF GOVERNMENT SPONSORSHIP AND LIMITATION OF LIABILITY

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```
*****
*
*   This output was produced by the model:
*
*           GWSCREEN
*   Version Control Copy, Version 2.02
*   A semi-analytical model for the assessment
*   of the groundwater pathway from the leaching
*   of surficial and buried contamination and
*   release of contaminants from percolation ponds
*   10-11-93
*   Arthur S. Rood
*   Idaho National Engineering Laboratory
*   EG&G Idaho Inc.
*   Subsurface and Environmental Modeling Unit
*   PO Box 1625
*   Idaho Falls, Idaho 83415
*****
```

>>> TITLE OF PROJECT:

CFA Landfill II - 2-hexanone

### GAUSSIAN QUADRATURE SOLUTION

#### MODEL OPTIONS

IMODE: 4

KFLAG: 1 (0)CONC VS TIME; (1)PEAK CONC AND LIMITING SOIL CONC

IMODEL:1 (1) SURF OR BURIED SOURCE; (2)POND SOURCE; (3) TABULATED SOURCE FUNCTION

>>> INPUT DATA

```
*****
NUMBER OF RADIOACTIVE PROGENY          0
LENGTH OF SOURCE PARALLEL TO GW FLOW (m)  3.00E+02
WIDTH OF SOURCE PERPENDICULAR TO GW FLOW (m)  1.90E+02
THICKNESS OF SOURCE (m)                3.00E+00
PERCOLATION RATE (darcy vel m/y)        1.00E-01
VOLUMETRIC WATER CONTENT IN SOURCE      3.40E-01
VOLUMETRIC WATER CONTENT IN UNSATURATED ZONE  3.40E-01
BULK DENSITY AT SOURCE (g/cm**3)        1.50E+00
SORPTION COEFFICIENT AT SOURCE (ml/g)    4.05E-01
BULK DENSITY IN UNSAT ZONE (g/cm**3)    1.50E+00
UNSATURATED ZONE THICKNESS (m)          1.60E+01
```

|  |          |
|--|----------|
| SORPTION COEFFICIENT IN UNSAT ZONE (ml/g)      | 4.05E-01 |
| OPTIONAL LOSS RATE CONSTANT FOR SOURCE (y**-1) | 0.00E+00 |
| INITIAL MASS OR ACTIVITY (mg or Ci)            | 6.41E+07 |
| MOLECULAR WEIGHT (g/mole)                      | 1.00E+01 |
| SOLUBILITY LIMIT (mg/L)                        | 1.40E+04 |
| HALF-LIFE(S) OF CONTAMINANT AND PROGENY (y)    | 1.00E+38 |
| BULK DENSITY OF AQUIFER (g/cm**3)              | 1.90E+00 |
| POROSITY OF AQUIFER                            | 1.00E-01 |
| SORPTION COEFFICIENT(S) IN AQUIFER (ml/g)      | 0.00E+00 |
| DISPERSIVITY X DIRECTION (m)                   | 9.00E+00 |
| DISPERSIVITY Y DIRECTION (m)                   | 4.00E+00 |
| PORE VELOCITY (m/y)                            | 5.70E+02 |
| WELL SCREEN THICKNESS (m)                      | 1.50E+01 |
| DISTANCE TO RECEPTOR ALONG X AXIS (m)          | 1.50E+02 |
| DISTANCE TO RECEPTOR ALONG Y AXIS (m)          | 0.00E+00 |
| LIMITING CONTAMINANT GW CONCENTRATION (mg/L)   | 0.00E+00 |
| UNITS OF CONTAMINANT                           | mg       |

INPUT DATA FILE CREATED BY: John O. Maynard DATE 8/22/94

INPUT DATA CHECKED BY: Bonding DATE 8/22/94

#### LIMITING SOIL CONCENTRATION CALCULATION

>>> VALUES CALCULATED IN SOURCE SUBROUTINE

|   |            |
|---|------------|
| LEACH RATE CONSTANT (1/y)               | 3.5180E-02 |
| UNSATURATED PORE VELOCITY (m/y)         | 2.9412E-01 |
| DECAY CONSTANT(S) (1/y)                 | 0.0000E+00 |
| RETARDATION FACTOR(S) (SATURATED)       | 1.0000E+00 |
| RETARDATION FACTOR (UNSATURATED)        | 2.7868E+00 |
| SOLUBILITY LIMITED MASS (mg)            | 2.2683E+12 |
| SOLUBILITY LIMITED ACTIVITY (Ci)        | 0.0000E+00 |
| TRANSIT TIME IN UNSAT ZONE (years)      | 1.5160E+02 |
| FRACTION DECAYED DURING UNSAT TRANSPORT | 0.0000E+00 |

>>> EXPOSURE DATA FOR LIMITING SOIL CONCENTRATION

|                                 |           |
|---------------------------------|-----------|
| INTEGRATION TIME (years)        | 1         |
| BODY WEIGHT (kg)                | 7.000E+01 |
| AVERAGING TIME (days)           | 2.555E+04 |
| WATER INTAKE RATE (L/d)         | 2.000E+00 |
| EXPOSURE FREQUENCY (days/year)  | 3.500E+02 |
| EXPOSURE DURATION (years)       | 7.000E+01 |
| RADIOLOGICAL DOSE LIMIT (rem/y) | 4.000E-03 |
| CARCINOGENIC RISK CRITERIA      | 1.000E-06 |
| HAZARD QUOTIENT                 | 1.000E+00 |

>>> RESULTS OF CALCULATIONS

#### MAXIMUM NON RADIOLOGICAL CONTAMINANT CALCULATION

|  |               |
|--|---------------|
| MAXIMUM CONCENTRATION                  | 1.33E-02 mg/L |
| AVERAGE CONCENTRATION                  | 1.33E-02 mg/L |
| PEAK TIME (y):                         | 1.524680E+02  |
| LIMITING SOIL CONCENTRATION (mg/m**3): | 0.000E+00     |
| LIMITING SOIL CONCENTRATION (mg/kg):   | 0.000E+00     |
| LIMITING INVENTORY IN SOIL (mg):       | 0.000E+00     |
| EXECUTION TIME (seconds)               | 4             |

## CFA Landfill II - ethylbenzene

TIME OF RUN 19:46:20.4

DATE OF RUN 08/05/94

INPUT FILE NAME: ethylben.inp

OUTPUT FILE NAME: ethylben.out

=====

### ACKNOWLEDGEMENT OF GOVERNMENT SPONSORSHIP AND LIMITATION OF LIABILITY

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=====

\*\*\*\*\*

|  |   |
|--|---|
| *  | * |
| * This output was produced by the model:         | * |
| *  | * |
| * GWSCREEN                                       | * |
| * Version Control Copy, Version 2.02             | * |
| * A semi-analytical model for the assessment     | * |
| * of the groundwater pathway from the leaching   | * |
| * of surficial and buried contamination and      | * |
| * release of contaminants from percolation ponds | * |
| * 10-11-93                                       | * |
| * Arthur S. Rood                                 | * |
| * Idaho National Engineering Laboratory          | * |
| * EG&G Idaho Inc.                                | * |
| * Subsurface and Environmental Modeling Unit     | * |
| * PO Box 1625                                    | * |
| * Idaho Falls, Idaho 83415                       | * |

\*\*\*\*\*

>>> TITLE OF PROJECT:

CFA Landfill II - ethylbenzene

=====

### GAUSSIAN QUADRATURE SOLUTION

#### MODEL OPTIONS

IMODE: 4

KFLAG: 1 (0)CONC VS TIME; (1)PEAK CONC AND LIMITING SOIL CONC

IMODEL:1 (1) SURF OR BURIED SOURCE; (2)POND SOURCE; (3) TABULATED SOURCE FUNCTION

>>> INPUT DATA

\*\*\*\*\*

|  |          |
|--|----------|
| NUMBER OF RADIOACTIVE PROGENY                | 0        |
| LENGTH OF SOURCE PARALLEL TO GW FLOW (m)     | 3.00E+02 |
| WIDTH OF SOURCE PERPENDICULAR TO GW FLOW (m) | 1.90E+02 |
| THICKNESS OF SOURCE (m)                      | 3.00E+00 |
| PERCOLATION RATE (darcy vel m/y)             | 1.00E-01 |
| VOLUMETRIC WATER CONTENT IN SOURCE           | 3.40E-01 |
| VOLUMETRIC WATER CONTENT IN UNSATURATED ZONE | 3.40E-01 |
| BULK DENSITY AT SOURCE (g/cm**3)             | 1.50E+00 |
| SORPTION COEFFICIENT AT SOURCE (ml/g)        | 3.30E+00 |
| BULK DENSITY IN UNSAT ZONE (g/cm**3)         | 1.50E+00 |
| UNSATURATED ZONE THICKNESS (m)               | 1.60E+01 |

|  |          |
|--|----------|
| SORPTION COEFFICIENT IN UNSAT ZONE (ml/g)      | 3.30E+00 |
| OPTIONAL LOSS RATE CONSTANT FOR SOURCE (y**-1) | 0.00E+00 |
| INITIAL MASS OR ACTIVITY (mg or Ci)            | 2.05E+06 |
| MOLECULAR WEIGHT (g/mole)                      | 1.00E+01 |
| SOLUBILITY LIMIT (mg/L)                        | 1.52E+02 |
| HALF-LIFE(S) OF CONTAMINANT AND PROGENY (y)    | 1.00E+38 |
| BULK DENSITY OF AQUIFER (g/cm**3)              | 1.90E+00 |
| POROSITY OF AQUIFER                            | 1.00E-01 |
| SORPTION COEFFICIENT(S) IN AQUIFER (ml/g)      | 0.00E+00 |
| DISPERSIVITY X DIRECTION (m)                   | 9.00E+00 |
| DISPERSIVITY Y DIRECTION (m)                   | 4.00E+00 |
| PORE VELOCITY (m/y)                            | 5.70E+02 |
| WELL SCREEN THICKNESS (m)                      | 1.50E+01 |
| DISTANCE TO RECEPTOR ALONG X AXIS (m)          | 1.50E+02 |
| DISTANCE TO RECEPTOR ALONG Y AXIS (m)          | 0.00E+00 |
| LIMITING CONTAMINANT GW CONCENTRATION (mg/L)   | 2.00E+00 |
| UNITS OF CONTAMINANT                           | mg       |

INPUT DATA FILE CREATED BY: John O. Maynard DATE 8/22/94

INPUT DATA CHECKED BY: S. Sandberg DATE 8/22/94

#### LIMITING SOIL CONCENTRATION CALCULATION

##### >>> VALUES CALCULATED IN SOURCE SUBROUTINE

\*\*\*\*\*

|   |            |
|---|------------|
| LEACH RATE CONSTANT (1/y)               | 6.3012E-03 |
| UNSATURATED PORE VELOCITY (m/y)         | 2.9412E-01 |
| DECAY CONSTANT(S) (1/y)                 | 0.0000E+00 |
| RETARDATION FACTOR(S) (SATURATED)       | 1.0000E+00 |
| RETARDATION FACTOR (UNSATURATED)        | 1.5559E+01 |
| SOLUBILITY LIMITED MASS (mg)            | 1.3750E+11 |
| SOLUBILITY LIMITED ACTIVITY (Ci)        | 0.0000E+00 |
| TRANSIT TIME IN UNSAT ZONE (years)      | 8.4640E+02 |
| FRACTION DECAYED DURING UNSAT TRANSPORT | 0.0000E+00 |

##### >>> EXPOSURE DATA FOR LIMITING SOIL CONCENTRATION

\*\*\*\*\*

|                                 |           |
|---------------------------------|-----------|
| INTEGRATION TIME (years)        | 1         |
| BODY WEIGHT (kg)                | 7.000E+01 |
| AVERAGING TIME (days)           | 2.555E+04 |
| WATER INTAKE RATE (L/d)         | 2.000E+00 |
| EXPOSURE FREQUENCY (days/year)  | 3.500E+02 |
| EXPOSURE DURATION (years)       | 7.000E+01 |
| RADIOLOGICAL DOSE LIMIT (rem/y) | 4.000E-03 |
| CARCINOGENIC RISK CRITERIA      | 1.000E-06 |
| HAZARD QUOTIENT                 | 1.000E+00 |

##### >>> RESULTS OF CALCULATIONS

\*\*\*\*\*

#### MAXIMUM NON RADIOLOGICAL CONTAMINANT CALCULATION

|  |               |
|--|---------------|
| MAXIMUM CONCENTRATION                  | 7.76E-05 mg/L |
| AVERAGE CONCENTRATION                  | 7.76E-05 mg/L |
| PEAK TIME (y):                         | 8.474045E+02  |
| LIMITING SOIL CONCENTRATION (mg/m**3): | 3.090E+05     |
| LIMITING SOIL CONCENTRATION (mg/kg):   | 2.060E+02     |
| LIMITING INVENTORY IN SOIL (mg):       | 5.283E+10     |
| EXECUTION TIME (seconds)               | 4             |



## CFA Landfill II - toluene

TIME OF RUN 19:46:40.5

DATE OF RUN 08/05/94

INPUT FILE NAME: toluene.inp

OUTPUT FILE NAME: toluene.out

=====

### ACKNOWLEDGEMENT OF GOVERNMENT SPONSORSHIP AND LIMITATION OF LIABILITY

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=====

\*\*\*\*\*

|  |   |
|--|---|
| *  | * |
| * This output was produced by the model:         | * |
| *  | * |
| * GWSCREEN                                       | * |
| * Version Control Copy, Version 2.02             | * |
| * A semi-analytical model for the assessment     | * |
| * of the groundwater pathway from the leaching   | * |
| * of surficial and buried contamination and      | * |
| * release of contaminants from percolation ponds | * |
| * 10-11-93                                       | * |
| * Arthur S. Rood                                 | * |
| * Idaho National Engineering Laboratory          | * |
| * EG&G Idaho Inc.                                | * |
| * Subsurface and Environmental Modeling Unit     | * |
| * PO Box 1625                                    | * |
| * Idaho Falls, Idaho 83415                       | * |

\*\*\*\*\*

>>> TITLE OF PROJECT:

CFA Landfill II - toluene

-----

### GAUSSIAN QUADRATURE SOLUTION

#### MODEL OPTIONS

IMODE: 4

KFLAG: 1 (0)CONC VS TIME; (1)PEAK CONC AND LIMITING SOIL CONC

IMODEL: 1 (1) SURF OR BURIED SOURCE; (2)POND SOURCE; (3) TABULATED SOURCE FUNCTION

#### >>> INPUT DATA

\*\*\*\*\*

|  |          |
|--|----------|
| NUMBER OF RADIOACTIVE PROGENY                | 0        |
| LENGTH OF SOURCE PARALLEL TO GW FLOW (m)     | 3.00E+02 |
| WIDTH OF SOURCE PERPENDICULAR TO GW FLOW (m) | 1.90E+02 |
| THICKNESS OF SOURCE (m)                      | 3.00E+00 |
| PERCOLATION RATE (darcy vel m/y)             | 1.00E-01 |
| VOLUMETRIC WATER CONTENT IN SOURCE           | 3.40E-01 |
| VOLUMETRIC WATER CONTENT IN UNSATURATED ZONE | 3.40E-01 |
| BULK DENSITY AT SOURCE (g/cm**3)             | 1.50E+00 |
| SORPTION COEFFICIENT AT SOURCE (ml/g)        | 9.00E-01 |
| BULK DENSITY IN UNSAT ZONE (g/cm**3)         | 1.50E+00 |
| UNSATURATED ZONE THICKNESS (m)               | 1.60E+01 |

|  |          |
|--|----------|
| SORPTION COEFFICIENT IN UNSAT ZONE (ml/g)      | 9.00E-01 |
| OPTIONAL LOSS RATE CONSTANT FOR SOURCE (y**-1) | 0.00E+00 |
| INITIAL MASS OR ACTIVITY (mg or Ci)            | 1.03E+06 |
| MOLECULAR WEIGHT (g/mole)                      | 1.00E+01 |
| SOLUBILITY LIMIT (mg/L)                        | 5.35E+02 |
| HALF-LIFE(S) OF CONTAMINANT AND PROGENY (y)    | 1.00E+38 |
| BULK DENSITY OF AQUIFER (g/cm**3)              | 1.90E+00 |
| POROSITY OF AQUIFER                            | 1.00E-01 |
| SORPTION COEFFICIENT(S) IN AQUIFER (ml/g)      | 0.00E+00 |
| DISPERSIVITY X DIRECTION (m)                   | 9.00E+00 |
| DISPERSIVITY Y DIRECTION (m)                   | 4.00E+00 |
| PORE VELOCITY (m/y)                            | 5.70E+02 |
| WELL SCREEN THICKNESS (m)                      | 1.50E+01 |
| DISTANCE TO RECEPTOR ALONG X AXIS (m)          | 1.50E+02 |
| DISTANCE TO RECEPTOR ALONG Y AXIS (m)          | 0.00E+00 |
| LIMITING CONTAMINANT GW CONCENTRATION (mg/L)   | 1.00E+00 |
| UNITS OF CONTAMINANT                           | mg       |

INPUT DATA FILE CREATED BY: *J. Sondrup* DATE 8/22/94

INPUT DATA CHECKED BY: *John O. Magnus* DATE 8/22/94

#### LIMITING SOIL CONCENTRATION CALCULATION

>>> VALUES CALCULATED IN SOURCE SUBROUTINE

|   |            |
|---|------------|
| LEACH RATE CONSTANT (1/y)               | 1.9724E-02 |
| UNSATURATED PORE VELOCITY (m/y)         | 2.9412E-01 |
| DECAY CONSTANT(S) (1/y)                 | 0.0000E+00 |
| RETARDATION FACTOR(S) (SATURATED)       | 1.0000E+00 |
| RETARDATION FACTOR (UNSATURATED)        | 4.9706E+00 |
| SOLUBILITY LIMITED MASS (mg)            | 1.5461E+11 |
| SOLUBILITY LIMITED ACTIVITY (Ci)        | 0.0000E+00 |
| TRANSIT TIME IN UNSAT ZONE (years)      | 2.7040E+02 |
| FRACTION DECAYED DURING UNSAT TRANSPORT | 0.0000E+00 |

>>> EXPOSURE DATA FOR LIMITING SOIL CONCENTRATION

|                                 |           |
|---------------------------------|-----------|
| INTEGRATION TIME (years)        | 1         |
| BODY WEIGHT (kg)                | 7.000E+01 |
| AVERAGING TIME (days)           | 2.555E+04 |
| WATER INTAKE RATE (L/d)         | 2.000E+00 |
| EXPOSURE FREQUENCY (days/year)  | 3.500E+02 |
| EXPOSURE DURATION (years)       | 7.000E+01 |
| RADIOLOGICAL DOSE LIMIT (rem/y) | 4.000E-03 |
| CARCINOGENIC RISK CRITERIA      | 1.000E-06 |
| HAZARD QUOTIENT                 | 1.000E+00 |

>>> RESULTS OF CALCULATIONS

#### MAXIMUM NON RADIOLOGICAL CONTAMINANT CALCULATION

|  |               |
|--|---------------|
| MAXIMUM CONCENTRATION                  | 1.21E-04 mg/L |
| AVERAGE CONCENTRATION                  | 1.21E-04 mg/L |
| PEAK TIME (y):                         | 2.713086E+02  |
| LIMITING SOIL CONCENTRATION (mg/m**3): | 4.979E+04     |
| LIMITING SOIL CONCENTRATION (mg/kg):   | 3.319E+01     |
| LIMITING INVENTORY IN SOIL (mg):       | 8.514E+09     |
| EXECUTION TIME (seconds)               | 4             |

## CFA Landfill II - xylene

TIME OF RUN 19:46:53.8

DATE OF RUN 08/05/94

INPUT FILE NAME: xylene.inp

OUTPUT FILE NAME: xylene.out

### =====

#### ACKNOWLEDGEMENT OF GOVERNMENT SPONSORSHIP AND LIMITATION OF LIABILITY

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=====

```
*****
*                                     *
*   This output was produced by the model:   *
*                                     *
*               GWSCREEN               *
*   Version Control Copy, Version 2.02   *
*   A semi-analytical model for the assessment *
*   of the groundwater pathway from the leaching *
*   of surficial and buried contamination and *
*   release of contaminants from percolation ponds *
*   10-11-93                             *
*   Arthur S. Rood                        *
*   Idaho National Engineering Laboratory *
*   EG&G Idaho Inc.                     *
*   Subsurface and Environmental Modeling Unit *
*   PO Box 1625                          *
*   Idaho Falls, Idaho 83415             *
*****
```

>>> TITLE OF PROJECT:

CFA Landfill II - xylene

#### =====

#### GAUSSIAN QUADRATURE SOLUTION

##### MODEL OPTIONS

IMODE: 4

KFLAG: 1 (0)CONC VS TIME; (1)PEAK CONC AND LIMITING SOIL CONC

IMODEL:1 (1) SURF OR BURIED SOURCE; (2)POND SOURCE; (3) TABULATED SOURCE FUNCTION

>>> INPUT DATA

```
*****
NUMBER OF RADIOACTIVE PROGENY           0
LENGTH OF SOURCE PARALLEL TO GW FLOW (m) 3.00E+02
WIDTH OF SOURCE PERPENDICULAR TO GW FLOW (m) 1.90E+02
THICKNESS OF SOURCE (m)                 3.00E+00
PERCOLATION RATE (darcy vel m/y)        1.00E-01
VOLUMETRIC WATER CONTENT IN SOURCE      3.40E-01
VOLUMETRIC WATER CONTENT IN UNSATURATED ZONE 3.40E-01
BULK DENSITY AT SOURCE (g/cm**3)        1.50E+00
SORPTION COEFFICIENT AT SOURCE (ml/g)    7.20E-01
BULK DENSITY IN UNSAT ZONE (g/cm**3)    1.50E+00
UNSATURATED ZONE THICKNESS (m)          1.60E+01
```

SORPTION COEFFICIENT IN UNSAT ZONE (ml/g) 7.20E-01  
 OPTIONAL LOSS RATE CONSTANT FOR SOURCE (y\*\*<sup>-1</sup>) 0.00E+00  
 INITIAL MASS OR ACTIVITY (mg or Ci) 1.64E+07  
 MOLECULAR WEIGHT (g/mole) 1.00E+01  
 SOLUBILITY LIMIT (mg/L) 1.98E+02  
 HALF-LIFE(S) OF CONTAMINANT AND PROGENY (y) 1.00E+38  
 BULK DENSITY OF AQUIFER (g/cm\*\*3) 1.90E+00  
 POROSITY OF AQUIFER 1.00E-01  
 SORPTION COEFFICIENT(S) IN AQUIFER (ml/g) 0.00E+00  
 DISPERSIVITY X DIRECTION (m) 9.00E+00  
 DISPERSIVITY Y DIRECTION (m) 4.00E+00  
 PORE VELOCITY (m/y) 5.70E+02  
 WELL SCREEN THICKNESS (m) 1.50E+01  
 DISTANCE TO RECEPTOR ALONG X AXIS (m) 1.50E+02  
 DISTANCE TO RECEPTOR ALONG Y AXIS (m) 0.00E+00  
 LIMITING CONTAMINANT GW CONCENTRATION (mg/L) 8.00E-01  
 UNITS OF CONTAMINANT mg

INPUT DATA FILE CREATED BY: Sandhu DATE 8/22/94

INPUT DATA CHECKED BY: John O. Magnus DATE 8/22/94

-----  
 LIMITING SOIL CONCENTRATION CALCULATION

>>> VALUES CALCULATED IN SOURCE SUBROUTINE

\*\*\*\*\*

LEACH RATE CONSTANT (1/y) 2.3474E-02  
 UNSATURATED PORE VELOCITY (m/y) 2.9412E-01  
 DECAY CONSTANT(S) (1/y) 0.0000E+00  
 RETARDATION FACTOR(S) (SATURATED) 1.0000E+00  
 RETARDATION FACTOR (UNSATURATED) 4.1765E+00  
 SOLUBILITY LIMITED MASS (mg) 4.8078E+10  
 SOLUBILITY LIMITED ACTIVITY (Ci) 0.0000E+00  
 TRANSIT TIME IN UNSAT ZONE (years) 2.2720E+02  
 FRACTION DECAYED DURING UNSAT TRANSPORT 0.0000E+00

>>> EXPOSURE DATA FOR LIMITING SOIL CONCENTRATION

\*\*\*\*\*

INTEGRATION TIME (years) 1  
 BODY WEIGHT (kg) 7.000E+01  
 AVERAGING TIME (days) 2.555E+04  
 WATER INTAKE RATE (L/d) 2.000E+00  
 EXPOSURE FREQUENCY (days/year) 3.500E+02  
 EXPOSURE DURATION (years) 7.000E+01  
 RADIOLOGICAL DOSE LIMIT (rem/y) 4.000E-03  
 CARCINOGENIC RISK CRITERIA 1.000E-06  
 HAZARD QUOTIENT 1.000E+00

>>> RESULTS OF CALCULATIONS

\*\*\*\*\*

MAXIMUM NON RADIOLOGICAL CONTAMINANT CALCULATION

MAXIMUM CONCENTRATION 2.29E-03 mg/L  
 AVERAGE CONCENTRATION 2.29E-03 mg/L  
 PEAK TIME (y): 2.280912E+02  
 LIMITING SOIL CONCENTRATION (mg/m\*\*3): 3.354E+04  
 LIMITING SOIL CONCENTRATION (mg/kg): 2.236E+01  
 LIMITING INVENTORY IN SOIL (mg): 5.736E+09  
 EXECUTION TIME (seconds) 4

## CFA Landfill II - tetrachloroethene

TIME OF RUN 19:46:33.9

DATE OF RUN 08/05/94

INPUT FILE NAME: tetrachl.inp

OUTPUT FILE NAME: tetrachl.out

### ACKNOWLEDGEMENT OF GOVERNMENT SPONSORSHIP AND LIMITATION OF LIABILITY

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```
*****
*
*   This output was produced by the model:
*
*           GWSCREEN
*   Version Control Copy, Version 2.02
*   A semi-analytical model for the assessment
*   of the groundwater pathway from the leaching
*   of surficial and buried contamination and
*   release of contaminants from percolation ponds
*           10-11-93
*           Arthur S. Rood
*   Idaho National Engineering Laboratory
*           EG&G Idaho Inc.
*   Subsurface and Environmental Modeling Unit
*           PO Box 1625
*           Idaho Falls, Idaho 83415
*****
```

>>> TITLE OF PROJECT:  
CFA Landfill II - tetrachloroethene

### GAUSSIAN QUADRATURE SOLUTION

#### MODEL OPTIONS

IMODE: 4

KFLAG: 1 (0)CONC VS TIME; (1)PEAK CONC AND LIMITING SOIL CONC

IMODEL:1 (1) SURF OR BURIED SOURCE; (2)POND SOURCE; (3) TABULATED SOURCE FUNCTION

#### >>> INPUT DATA

```
*****
NUMBER OF RADIOACTIVE PROGENY                0
LENGTH OF SOURCE PARALLEL TO GW FLOW (m)      3.00E+02
WIDTH OF SOURCE PERPENDICULAR TO GW FLOW (m)  1.90E+02
THICKNESS OF SOURCE (m)                      3.00E+00
PERCOLATION RATE (darcy vel m/y)             1.00E-01
VOLUMETRIC WATER CONTENT IN SOURCE            3.40E-01
VOLUMETRIC WATER CONTENT IN UNSATURATED ZONE  3.40E-01
BULK DENSITY AT SOURCE (g/cm**3)             1.50E+00
SORPTION COEFFICIENT AT SOURCE (ml/g)         1.09E+00
BULK DENSITY IN UNSAT ZONE (g/cm**3)         1.50E+00
UNSATURATED ZONE THICKNESS (m)               1.60E+01
```

|  |          |
|--|----------|
| SORPTION COEFFICIENT IN UNSAT ZONE (ml/g)      | 1.09E+00 |
| OPTIONAL LOSS RATE CONSTANT FOR SOURCE (y**-1) | 0.00E+00 |
| INITIAL MASS OR ACTIVITY (mg or Ci)            | 7.70E+05 |
| MOLECULAR WEIGHT (g/mole)                      | 1.00E+01 |
| SOLUBILITY LIMIT (mg/L)                        | 1.50E+02 |
| HALF-LIFE(S) OF CONTAMINANT AND PROGENY (y)    | 1.00E+38 |
| BULK DENSITY OF AQUIFER (g/cm**3)              | 1.90E+00 |
| POROSITY OF AQUIFER                            | 1.00E-01 |
| SORPTION COEFFICIENT(S) IN AQUIFER (ml/g)      | 0.00E+00 |
| DISPERSIVITY X DIRECTION (m)                   | 9.00E+00 |
| DISPERSIVITY Y DIRECTION (m)                   | 4.00E+00 |
| PORE VELOCITY (m/y)                            | 5.70E+02 |
| WELL SCREEN THICKNESS (m)                      | 1.50E+01 |
| DISTANCE TO RECEPTOR ALONG X AXIS (m)          | 1.50E+02 |
| DISTANCE TO RECEPTOR ALONG Y AXIS (m)          | 0.00E+00 |
| LIMITING CONTAMINANT GW CONCENTRATION (mg/L)   | 2.00E-03 |
| UNITS OF CONTAMINANT                           | mg       |

INPUT DATA FILE CREATED BY: Sondrup DATE 8/22/94

INPUT DATA CHECKED BY: John O. Magnusen DATE 8/22/94

-----  
 LIMITING SOIL CONCENTRATION CALCULATION  
 >>> VALUES CALCULATED IN SOURCE SUBROUTINE

\*\*\*\*\*  

|   |            |
|---|------------|
| LEACH RATE CONSTANT (1/y)               | 1.6878E-02 |
| UNSATURATED PORE VELOCITY (m/y)         | 2.9412E-01 |
| DECAY CONSTANT(S) (1/y)                 | 0.0000E+00 |
| RETARDATION FACTOR(S) (SATURATED)       | 1.0000E+00 |
| RETARDATION FACTOR (UNSATURATED)        | 5.8088E+00 |
| SOLUBILITY LIMITED MASS (mg)            | 5.0659E+10 |
| SOLUBILITY LIMITED ACTIVITY (Ci)        | 0.0000E+00 |
| TRANSIT TIME IN UNSAT ZONE (years)      | 3.1600E+02 |
| FRACTION DECAYED DURING UNSAT TRANSPORT | 0.0000E+00 |

 -----

>>> EXPOSURE DATA FOR LIMITING SOIL CONCENTRATION

\*\*\*\*\*  

|                                 |           |
|---------------------------------|-----------|
| INTEGRATION TIME (years)        | 1         |
| BODY WEIGHT (kg)                | 7.000E+01 |
| AVERAGING TIME (days)           | 2.555E+04 |
| WATER INTAKE RATE (L/d)         | 2.000E+00 |
| EXPOSURE FREQUENCY (days/year)  | 3.500E+02 |
| EXPOSURE DURATION (years)       | 7.000E+01 |
| RADIOLOGICAL DOSE LIMIT (rem/y) | 4.000E-03 |
| CARCINOGENIC RISK CRITERIA      | 1.000E-06 |
| HAZARD QUOTIENT                 | 1.000E+00 |

 -----

>>> RESULTS OF CALCULATIONS

\*\*\*\*\*  
 MAXIMUM NON RADIOLOGICAL CONTAMINANT CALCULATION  

|  |               |
|--|---------------|
| MAXIMUM CONCENTRATION                  | 7.75E-05 mg/L |
| AVERAGE CONCENTRATION                  | 7.75E-05 mg/L |
| PEAK TIME (y):                         | 3.169288E+02  |
| LIMITING SOIL CONCENTRATION (mg/m**3): | 1.162E+02     |
| LIMITING SOIL CONCENTRATION (mg/kg):   | 7.744E-02     |
| LIMITING INVENTORY IN SOIL (mg):       | 1.986E+07     |
| EXECUTION TIME (seconds)               | 4             |

## CFA Landfill II - trichloroethene

TIME OF RUN 19:46:47.1  
DATE OF RUN 08/05/94  
INPUT FILE NAME: trichlor.inp  
OUTPUT FILE NAME: trichlor.out

### =====

#### ACKNOWLEDGEMENT OF GOVERNMENT SPONSORSHIP AND LIMITATION OF LIABILITY

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=====

\*\*\*\*\*  
\*  
\* This output was produced by the model: \*  
\*  
\* GWSCREEN \*  
\* Version Control Copy, Version 2.02 \*  
\* A semi-analytical model for the assessment \*  
\* of the groundwater pathway from the leaching \*  
\* of surficial and buried contamination and \*  
\* release of contaminants from percolation ponds \*  
\* 10-11-93 \*  
\* Arthur S. Rood \*  
\* Idaho National Engineering Laboratory \*  
\* EG&G Idaho Inc. \*  
\* Subsurface and Environmental Modeling Unit \*  
\* PO Box 1625 \*  
\* Idaho Falls, Idaho 83415 \*  
\*\*\*\*\*

>>> TITLE OF PROJECT:  
CFA Landfill II - trichloroethene

#### -----

#### GAUSSIAN QUADRATURE SOLUTION

##### MODEL OPTIONS

IMODE: 4

KFLAG: 1 (0)CONC VS TIME; (1)PEAK CONC AND LIMITING SOIL CONC

IMODEL: 1 (1) SURF OR BURIED SOURCE; (2)POND SOURCE; (3) TABULATED SOURCE FUNCTION

##### >>> INPUT DATA

\*\*\*\*\*

|  |          |
|--|----------|
| NUMBER OF RADIOACTIVE PROGENY                | 0        |
| LENGTH OF SOURCE PARALLEL TO GW FLOW (m)     | 3.00E+02 |
| WIDTH OF SOURCE PERPENDICULAR TO GW FLOW (m) | 1.90E+02 |
| THICKNESS OF SOURCE (m)                      | 3.00E+00 |
| PERCOLATION RATE (darcy vel m/y)             | 1.00E-01 |
| VOLUMETRIC WATER CONTENT IN SOURCE           | 3.40E-01 |
| VOLUMETRIC WATER CONTENT IN UNSATURATED ZONE | 3.40E-01 |
| BULK DENSITY AT SOURCE (g/cm**3)             | 1.50E+00 |
| SORPTION COEFFICIENT AT SOURCE (ml/g)        | 3.78E-01 |
| BULK DENSITY IN UNSAT ZONE (g/cm**3)         | 1.50E+00 |
| UNSATURATED ZONE THICKNESS (m)               | 1.60E+01 |

SORPTION COEFFICIENT IN UNSAT ZONE (ml/g) 3.78E-01  
 OPTIONAL LOSS RATE CONSTANT FOR SOURCE (y\*\*-1) 0.00E+00  
 INITIAL MASS OR ACTIVITY (mg or Ci) 5.13E+05  
 MOLECULAR WEIGHT (g/mole) 1.00E+01  
 SOLUBILITY LIMIT (mg/L) 1.10E+03  
 HALF-LIFE(S) OF CONTAMINANT AND PROGENY (y) 1.00E+38  
 BULK DENSITY OF AQUIFER (g/cm\*\*3) 1.90E+00  
 POROSITY OF AQUIFER 1.00E-01  
 SORPTION COEFFICIENT(S) IN AQUIFER (ml/g) 0.00E+00  
 DISPERSIVITY X DIRECTION (m) 9.00E+00  
 DISPERSIVITY Y DIRECTION (m) 4.00E+00  
 PORE VELOCITY (m/y) 5.70E+02  
 WELL SCREEN THICKNESS (m) 1.50E+01  
 DISTANCE TO RECEPTOR ALONG X AXIS (m) 1.50E+02  
 DISTANCE TO RECEPTOR ALONG Y AXIS (m) 0.00E+00  
 LIMITING CONTAMINANT GW CONCENTRATION (mg/L) 3.00E-03  
 UNITS OF CONTAMINANT mg

INPUT DATA FILE CREATED BY: Sondrup DATE 8/22/94

INPUT DATA CHECKED BY: John C. Magnus DATE 8/22/94

-----  
 LIMITING SOIL CONCENTRATION CALCULATION

>>> VALUES CALCULATED IN SOURCE SUBROUTINE

\*\*\*\*\*

LEACH RATE CONSTANT (1/y) 3.6751E-02  
 UNSATURATED PORE VELOCITY (m/y) 2.9412E-01  
 DECAY CONSTANT(S) (1/y) 0.0000E+00  
 RETARDATION FACTOR(S) (SATURATED) 1.0000E+00  
 RETARDATION FACTOR (UNSATURATED) 2.6676E+00  
 SOLUBILITY LIMITED MASS (mg) 1.7061E+11  
 SOLUBILITY LIMITED ACTIVITY (Ci) 0.0000E+00  
 TRANSIT TIME IN UNSAT ZONE (years) 1.4512E+02  
 FRACTION DECAYED DURING UNSAT TRANSPORT 0.0000E+00

>>> EXPOSURE DATA FOR LIMITING SOIL CONCENTRATION

\*\*\*\*\*

INTEGRATION TIME (years) 1  
 BODY WEIGHT (kg) 7.000E+01  
 AVERAGING TIME (days) 2.555E+04  
 WATER INTAKE RATE (L/d) 2.000E+00  
 EXPOSURE FREQUENCY (days/year) 3.500E+02  
 EXPOSURE DURATION (years) 7.000E+01  
 RADIOLOGICAL DOSE LIMIT (rem/y) 4.000E-03  
 CARCINOGENIC RISK CRITERIA 1.000E-06  
 HAZARD QUOTIENT 1.000E+00

>>> RESULTS OF CALCULATIONS

\*\*\*\*\*

MAXIMUM NON RADIOLOGICAL CONTAMINANT CALCULATION

MAXIMUM CONCENTRATION 1.11E-04 mg/L  
 AVERAGE CONCENTRATION 1.11E-04 mg/L  
 PEAK TIME (y): 1.459846E+02  
 LIMITING SOIL CONCENTRATION (mg/m\*\*3): 8.098E+01  
 LIMITING SOIL CONCENTRATION (mg/kg): 5.398E-02  
 LIMITING INVENTORY IN SOIL (mg): 1.385E+07  
 EXECUTION TIME (seconds) 4



## CFA Landfill II - lead

TIME OF RUN 11:40:47.0  
DATE OF RUN 08/07/94  
INPUT FILE NAME: lead.inp  
OUTPUT FILE NAME: lead.out

### =====

#### ACKNOWLEDGEMENT OF GOVERNMENT SPONSORSHIP AND LIMITATION OF LIABILITY

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=====

\*\*\*\*\*  
\*  
\* This output was produced by the model: \*  
\*  
\* GWSCREEN \*  
\* Version Control Copy, Version 2.02 \*  
\* A semi-analytical model for the assessment \*  
\* of the groundwater pathway from the leaching \*  
\* of surficial and buried contamination and \*  
\* release of contaminants from percolation ponds \*  
\* 10-11-93 \*  
\* Arthur S. Rood \*  
\* Idaho National Engineering Laboratory \*  
\* EG&G Idaho Inc. \*  
\* Subsurface and Environmental Modeling Unit \*  
\* PO Box 1625 \*  
\* Idaho Falls, Idaho 83415 \*  
\*\*\*\*\*

>>> TITLE OF PROJECT:  
CFA Landfill II - lead

#### =====

#### GAUSSIAN QUADRATURE SOLUTION

##### MODEL OPTIONS

IMODE: 4

KFLAG: 1 (0)CONC VS TIME; (1)PEAK CONC AND LIMITING SOIL CONC

IMODEL:1 (1) SURF OR BURIED SOURCE; (2)POND SOURCE; (3) TABULATED SOURCE FUNCTION

##### >>> INPUT DATA

\*\*\*\*\*

|  |          |
|--|----------|
| NUMBER OF RADIOACTIVE PROGENY                | 0        |
| LENGTH OF SOURCE PARALLEL TO GW FLOW (m)     | 3.00E+02 |
| WIDTH OF SOURCE PERPENDICULAR TO GW FLOW (m) | 1.90E+02 |
| THICKNESS OF SOURCE (m)                      | 3.00E+00 |
| PERCOLATION RATE (darcy vel m/y)             | 1.00E-01 |
| VOLUMETRIC WATER CONTENT IN SOURCE           | 3.40E-01 |
| VOLUMETRIC WATER CONTENT IN UNSATURATED ZONE | 3.40E-01 |
| BULK DENSITY AT SOURCE (g/cm**3)             | 1.50E+00 |
| SORPTION COEFFICIENT AT SOURCE (ml/g)        | 1.00E+02 |
| BULK DENSITY IN UNSAT ZONE (g/cm**3)         | 1.50E+00 |
| UNSATURATED ZONE THICKNESS (m)               | 1.60E+01 |

|  |          |
|--|----------|
| SORPTION COEFFICIENT IN UNSAT ZONE (m1/g)      | 1.00E+02 |
| OPTIONAL LOSS RATE CONSTANT FOR SOURCE (y**-1) | 0.00E+00 |
| INITIAL MASS OR ACTIVITY (mg or Ci)            | 6.54E+10 |
| MOLECULAR WEIGHT (g/mole)                      | 1.00E+00 |
| SOLUBILITY LIMIT (mg/L)                        | 1.25E+02 |
| HALF-LIFE(S) OF CONTAMINANT AND PROGENY (y)    | 1.00E+38 |
| BULK DENSITY OF AQUIFER (g/cm**3)              | 1.90E+00 |
| POROSITY OF AQUIFER                            | 1.00E-01 |
| SORPTION COEFFICIENT(S) IN AQUIFER (m1/g)      | 0.00E+00 |
| DISPERSIVITY X DIRECTION (m)                   | 9.00E+00 |
| DISPERSIVITY Y DIRECTION (m)                   | 4.00E+00 |
| PORE VELOCITY (m/y)                            | 5.70E+02 |
| WELL SCREEN THICKNESS (m)                      | 1.50E+01 |
| DISTANCE TO RECEPTOR ALONG X AXIS (m)          | 1.50E+02 |
| DISTANCE TO RECEPTOR ALONG Y AXIS (m)          | 0.00E+00 |
| LIMITING CONTAMINANT GW CONCENTRATION (mg/L)   | 0.00E+00 |
| UNITS OF CONTAMINANT                           | mg       |

INPUT DATA FILE CREATED BY: J. Sandberg DATE 8/22/94

INPUT DATA CHECKED BY: John O. Maynard DATE 8/22/94

#### LIMITING SOIL CONCENTRATION CALCULATION

>>> VALUES CALCULATED IN SOURCE SUBROUTINE

\*\*\*\*\*

|   |            |
|---|------------|
| LEACH RATE CONSTANT (1/y)               | 2.2172E-04 |
| UNSATURATED PORE VELOCITY (m/y)         | 2.9412E-01 |
| DECAY CONSTANT(S) (1/y)                 | 0.0000E+00 |
| RETARDATION FACTOR(S) (SATURATED)       | 1.0000E+00 |
| RETARDATION FACTOR (UNSATURATED)        | 4.4218E+02 |
| SOLUBILITY LIMITED MASS (mg)            | 3.2135E+12 |
| SOLUBILITY LIMITED ACTIVITY (Ci)        | 0.0000E+00 |
| TRANSIT TIME IN UNSAT ZONE (years)      | 2.4054E+04 |
| FRACTION DECAYED DURING UNSAT TRANSPORT | 0.0000E+00 |

>>> EXPOSURE DATA FOR LIMITING SOIL CONCENTRATION

\*\*\*\*\*

|                                 |           |
|---------------------------------|-----------|
| INTEGRATION TIME (years)        | 1         |
| BODY WEIGHT (kg)                | 7.000E+01 |
| AVERAGING TIME (days)           | 2.555E+04 |
| WATER INTAKE RATE (L/d)         | 2.000E+00 |
| EXPOSURE FREQUENCY (days/year)  | 3.500E+02 |
| EXPOSURE DURATION (years)       | 7.000E+01 |
| RADIOLOGICAL DOSE LIMIT (rem/y) | 4.000E-03 |
| CARCINOGENIC RISK CRITERIA      | 1.000E-06 |
| HAZARD QUOTIENT                 | 1.000E+00 |

>>> RESULTS OF CALCULATIONS

\*\*\*\*\*

#### MAXIMUM NON RADIOLOGICAL CONTAMINANT CALCULATION

|  |               |
|--|---------------|
| MAXIMUM CONCENTRATION                  | 8.75E-02 mg/L |
| AVERAGE CONCENTRATION                  | 8.75E-02 mg/L |
| PEAK TIME (y):                         | 2.405570E+04  |
| LIMITING SOIL CONCENTRATION (mg/m**3): | 0.000E+00     |
| LIMITING SOIL CONCENTRATION (mg/kg):   | 0.000E+00     |
| LIMITING INVENTORY IN SOIL (mg):       | 0.000E+00     |
| EXECUTION TIME (seconds)               | 3             |

## CFA Landfill II - benzo(a)pyrene, waste oil inventory

TIME OF RUN 14:11:57.5  
DATE OF RUN 08/07/94  
INPUT FILE NAME: benzopyr.inp  
OUTPUT FILE NAME: benzopyr.out

### ACKNOWLEDGEMENT OF GOVERNMENT SPONSORSHIP AND LIMITATION OF LIABILITY

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```
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*                                     *
*   This output was produced by the model:   *
*                                     *
*               GWSCREEN               *
*   Version Control Copy, Version 2.02   *
*   A semi-analytical model for the assessment *
*   of the groundwater pathway from the leaching *
*   of surficial and buried contamination and *
*   release of contaminants from percolation ponds *
*   10-11-93                             *
*   Arthur S. Rood                        *
*   Idaho National Engineering Laboratory *
*   EG&G Idaho Inc.                     *
*   Subsurface and Environmental Modeling Unit *
*   PO Box 1625                          *
*   Idaho Falls, Idaho 83415             *
*****
```

>>> TITLE OF PROJECT:  
CFA Landfill II - benzo(a)pyrene, waste oil inventory

### GAUSSIAN QUADRATURE SOLUTION

#### MODEL OPTIONS

IMODE: 4

KFLAG: 1 (0)CONC VS TIME; (1)PEAK CONC AND LIMITING SOIL CONC

IMODEL:1 (1) SURF OR BURIED SOURCE; (2)POND SOURCE; (3) TABULATED SOURCE FUNCTION

#### >>> INPUT DATA

\*\*\*\*\*

|  |          |
|--|----------|
| NUMBER OF RADIOACTIVE PROGENY                | 0        |
| LENGTH OF SOURCE PARALLEL TO GW FLOW (m)     | 1.00E+02 |
| WIDTH OF SOURCE PERPENDICULAR TO GW FLOW (m) | 1.50E+02 |
| THICKNESS OF SOURCE (m)                      | 3.00E+00 |
| PERCOLATION RATE (darcy vel m/y)             | 1.00E-01 |
| VOLUMETRIC WATER CONTENT IN SOURCE           | 3.40E-01 |
| VOLUMETRIC WATER CONTENT IN UNSATURATED ZONE | 3.40E-01 |
| BULK DENSITY AT SOURCE (g/cm**3)             | 1.50E+00 |
| SORPTION COEFFICIENT AT SOURCE (ml/g)        | 1.65E+04 |
| BULK DENSITY IN UNSAT ZONE (g/cm**3)         | 1.50E+00 |
| UNSATURATED ZONE THICKNESS (m)               | 1.60E+01 |

|   |          |
|---|----------|
| SORPTION COEFFICIENT IN UNSAT ZONE (ml/g)                   | 1.65E+04 |
| OPTIONAL LOSS RATE CONSTANT FOR SOURCE (y** <sup>-1</sup> ) | 0.00E+00 |
| INITIAL MASS OR ACTIVITY (mg or Ci)                         | 1.81E+06 |
| MOLECULAR WEIGHT (g/mole)                                   | 1.00E+01 |
| SOLUBILITY LIMIT (mg/L)                                     | 1.20E-03 |
| HALF-LIFE(S) OF CONTAMINANT AND PROGENY (y)                 | 1.00E+38 |
| BULK DENSITY OF AQUIFER (g/cm**3)                           | 1.90E+00 |
| POROSITY OF AQUIFER   | 1.00E-01 |
| SORPTION COEFFICIENT(S) IN AQUIFER (ml/g)                   | 0.00E+00 |
| DISPERSIVITY X DIRECTION (m)                                | 9.00E+00 |
| DISPERSIVITY Y DIRECTION (m)                                | 4.00E+00 |
| PORE VELOCITY (m/y)   | 5.70E+02 |
| WELL SCREEN THICKNESS (m)                                   | 1.50E+01 |
| DISTANCE TO RECEPTOR ALONG X AXIS (m)                       | 2.30E+02 |
| DISTANCE TO RECEPTOR ALONG Y AXIS (m)                       | 0.00E+00 |
| LIMITING CONTAMINANT GW CONCENTRATION (mg/L)                | 1.00E-05 |
| UNITS OF CONTAMINANT  | mg       |

INPUT DATA FILE CREATED BY: Sondrup DATE 8/22/94

INPUT DATA CHECKED BY: John O. Magnus DATE 8/22/94

#### LIMITING SOIL CONCENTRATION CALCULATION

>>> VALUES CALCULATED IN SOURCE SUBROUTINE

\*\*\*\*\*

|   |            |
|---|------------|
| LEACH RATE CONSTANT (1/y)               | 1.3468E-06 |
| UNSATURATED PORE VELOCITY (m/y)         | 2.9412E-01 |
| DECAY CONSTANT(S) (1/y)                 | 0.0000E+00 |
| RETARDATION FACTOR(S) (SATURATED)       | 1.0000E+00 |
| RETARDATION FACTOR (UNSATURATED)        | 7.2795E+04 |
| SOLUBILITY LIMITED MASS (mg)            | 1.3365E+09 |
| SOLUBILITY LIMITED ACTIVITY (Ci)        | 0.0000E+00 |
| TRANSIT TIME IN UNSAT ZONE (years)      | 3.9601E+06 |
| FRACTION DECAYED DURING UNSAT TRANSPORT | 0.0000E+00 |

>>> EXPOSURE DATA FOR LIMITING SOIL CONCENTRATION

\*\*\*\*\*

|                                 |           |
|---------------------------------|-----------|
| INTEGRATION TIME (years)        | 1         |
| BODY WEIGHT (kg)                | 7.000E+01 |
| AVERAGING TIME (days)           | 2.555E+04 |
| WATER INTAKE RATE (L/d)         | 2.000E+00 |
| EXPOSURE FREQUENCY (days/year)  | 3.500E+02 |
| EXPOSURE DURATION (years)       | 7.000E+01 |
| RADIOLOGICAL DOSE LIMIT (rem/y) | 4.000E-03 |
| CARCINOGENIC RISK CRITERIA      | 1.000E-06 |
| HAZARD QUOTIENT                 | 1.000E+00 |

>>> RESULTS OF CALCULATIONS

\*\*\*\*\*

#### MAXIMUM NON RADIOLOGICAL CONTAMINANT CALCULATION

|  |               |
|--|---------------|
| MAXIMUM CONCENTRATION                  | 1.73E-08 mg/L |
| AVERAGE CONCENTRATION                  | 1.73E-08 mg/L |
| PEAK TIME (y):                         | 3.960055E+06  |
| LIMITING SOIL CONCENTRATION (mg/m**3): | 2.331E+04     |
| LIMITING SOIL CONCENTRATION (mg/kg):   | 1.554E+01     |
| LIMITING INVENTORY IN SOIL (mg):       | 1.049E+09     |
| EXECUTION TIME (seconds)               | 3             |

## CFA Landfill II - benzo(a)anthracene, waste oil inventory

TIME OF RUN 14:11:51.1

DATE OF RUN 08/07/94

INPUT FILE NAME: benzoant.inp

OUTPUT FILE NAME: benzoant.out

### ACKNOWLEDGEMENT OF GOVERNMENT SPONSORSHIP AND LIMITATION OF LIABILITY

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```
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*   This output was produced by the model:
*
*           GWSCREEN
*   Version Control Copy, Version 2.02
*   A semi-analytical model for the assessment
*   of the groundwater pathway from the leaching
*   of surficial and buried contamination and
*   release of contaminants from percolation ponds
*   10-11-93
*   Arthur S. Rood
*   Idaho National Engineering Laboratory
*   EG&G Idaho Inc.
*   Subsurface and Environmental Modeling Unit
*   PO Box 1625
*   Idaho Falls, Idaho 83415
*****
```

>>> TITLE OF PROJECT:

CFA Landfill II - benzo(a)anthracene, waste oil inventory

GAUSSIAN QUADRATURE SOLUTION

MODEL OPTIONS

IMODE: 4

KFLAG: 1 (0)CONC VS TIME; (1)PEAK CONC AND LIMITING SOIL CONC

IMODEL:1 (1) SURF OR BURIED SOURCE; (2)POND SOURCE; (3) TABULATED SOURCE FUNCTION

>>> INPUT DATA

```
*****
NUMBER OF RADIOACTIVE PROGENY          0
LENGTH OF SOURCE PARALLEL TO GW FLOW (m)  1.00E+02
WIDTH OF SOURCE PERPENDICULAR TO GW FLOW (m)  1.50E+02
THICKNESS OF SOURCE (m)  3.00E+00
PERCOLATION RATE (darcy vel m/y)  1.00E-01
VOLUMETRIC WATER CONTENT IN SOURCE  3.40E-01
VOLUMETRIC WATER CONTENT IN UNSATURATED ZONE  3.40E-01
BULK DENSITY AT SOURCE (g/cm**3)  1.50E+00
SORPTION COEFFICIENT AT SOURCE (ml/g)  4.14E+03
BULK DENSITY IN UNSAT ZONE (g/cm**3)  1.50E+00
UNSATURATED ZONE THICKNESS (m)  1.60E+01
```

|  |          |
|--|----------|
| SORPTION COEFFICIENT IN UNSAT ZONE (ml/g)      | 4.14E+03 |
| OPTIONAL LOSS RATE CONSTANT FOR SOURCE (y**-1) | 0.00E+00 |
| INITIAL MASS OR ACTIVITY (mg or Ci)            | 8.76E+05 |
| MOLECULAR WEIGHT (g/mole)                      | 1.00E+01 |
| SOLUBILITY LIMIT (mg/L)                        | 5.70E-03 |
| HALF-LIFE(S) OF CONTAMINANT AND PROGENY (y)    | 1.00E+38 |
| BULK DENSITY OF AQUIFER (g/cm**3)              | 1.90E+00 |
| POROSITY OF AQUIFER                            | 1.00E-01 |
| SORPTION COEFFICIENT(S) IN AQUIFER (ml/g)      | 0.00E+00 |
| DISPERSIVITY X DIRECTION (m)                   | 9.00E+00 |
| DISPERSIVITY Y DIRECTION (m)                   | 4.00E+00 |
| PORE VELOCITY (m/y)                            | 5.70E+02 |
| WELL SCREEN THICKNESS (m)                      | 1.50E+01 |
| DISTANCE TO RECEPTOR ALONG X AXIS (m)          | 2.30E+02 |
| DISTANCE TO RECEPTOR ALONG Y AXIS (m)          | 0.00E+00 |
| LIMITING CONTAMINANT GW CONCENTRATION (mg/L)   | 1.00E-05 |
| UNITS OF CONTAMINANT                           | mg       |

INPUT DATA FILE CREATED BY: Sondent DATE 8/22/94

INPUT DATA CHECKED BY: Sam M. Myers DATE 8/22/94

#### LIMITING SOIL CONCENTRATION CALCULATION

>>> VALUES CALCULATED IN SOURCE SUBROUTINE

\*\*\*\*\*

|   |            |
|---|------------|
| LEACH RATE CONSTANT (1/y)               | 5.3674E-06 |
| UNSATURATED PORE VELOCITY (m/y)         | 2.9412E-01 |
| DECAY CONSTANT(S) (1/y)                 | 0.0000E+00 |
| RETARDATION FACTOR(S) (SATURATED)       | 1.0000E+00 |
| RETARDATION FACTOR (UNSATURATED)        | 1.8266E+04 |
| SOLUBILITY LIMITED MASS (mg)            | 1.5930E+09 |
| SOLUBILITY LIMITED ACTIVITY (Ci)        | 0.0000E+00 |
| TRANSIT TIME IN UNSAT ZONE (years)      | 9.9365E+05 |
| FRACTION DECAYED DURING UNSAT TRANSPORT | 0.0000E+00 |

>>> EXPOSURE DATA FOR LIMITING SOIL CONCENTRATION

\*\*\*\*\*

|                                 |           |
|---------------------------------|-----------|
| INTEGRATION TIME (years)        | 1         |
| BODY WEIGHT (kg)                | 7.000E+01 |
| AVERAGING TIME (days)           | 2.555E+04 |
| WATER INTAKE RATE (L/d)         | 2.000E+00 |
| EXPOSURE FREQUENCY (days/year)  | 3.500E+02 |
| EXPOSURE DURATION (years)       | 7.000E+01 |
| RADIOLOGICAL DOSE LIMIT (rem/y) | 4.000E-03 |
| CARCINOGENIC RISK CRITERIA      | 1.000E-06 |
| HAZARD QUOTIENT                 | 1.000E+00 |

>>> RESULTS OF CALCULATIONS

\*\*\*\*\*

#### MAXIMUM NON RADIOLOGICAL CONTAMINANT CALCULATION

|  |               |
|--|---------------|
| MAXIMUM CONCENTRATION                  | 3.33E-08 mg/L |
| AVERAGE CONCENTRATION                  | 3.33E-08 mg/L |
| PEAK TIME (y):                         | 9.936555E+05  |
| LIMITING SOIL CONCENTRATION (mg/m**3): | 5.848E+03     |
| LIMITING SOIL CONCENTRATION (mg/kg):   | 3.899E+00     |
| LIMITING INVENTORY IN SOIL (mg):       | 2.632E+08     |
| EXECUTION TIME (seconds)               | 3             |

## CFA Landfill II - pyrene, waste oil inventory

TIME OF RUN 14:12:16.4

DATE OF RUN 08/07/94

INPUT FILE NAME: pyrene.inp

OUTPUT FILE NAME: pyrene.out

### ACKNOWLEDGEMENT OF GOVERNMENT SPONSORSHIP AND LIMITATION OF LIABILITY

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```
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*
*   This output was produced by the model:
*
*           GWSCREEN
*   Version Control Copy, Version 2.02
*   A semi-analytical model for the assessment
*   of the groundwater pathway from the leaching
*   of surficial and buried contamination and
*   release of contaminants from percolation ponds
*           10-11-93
*           Arthur S. Rood
*   Idaho National Engineering Laboratory
*           EG&G Idaho Inc.
*   Subsurface and Environmental Modeling Unit
*           PO Box 1625
*           Idaho Falls, Idaho 83415
*****
```

>>> TITLE OF PROJECT:

CFA Landfill II - pyrene, waste oil inventory

GAUSSIAN QUADRATURE SOLUTION

MODEL OPTIONS

IMODE: 4

KFLAG: 1 (0)CONC VS TIME; (1)PEAK CONC AND LIMITING SOIL CONC

IMODEL:1 (1) SURF OR BURIED SOURCE; (2)POND SOURCE; (3) TABULATED SOURCE FUNCTION

>>> INPUT DATA

```
*****
NUMBER OF RADIOACTIVE PROGENY          0
LENGTH OF SOURCE PARALLEL TO GW FLOW (m)  1.00E+02
WIDTH OF SOURCE PERPENDICULAR TO GW FLOW (m)  1.50E+02
THICKNESS OF SOURCE (m)  3.00E+00
PERCOLATION RATE (darcy vel m/y)  1.00E-01
VOLUMETRIC WATER CONTENT IN SOURCE  3.40E-01
VOLUMETRIC WATER CONTENT IN UNSATURATED ZONE  3.40E-01
BULK DENSITY AT SOURCE (g/cm**3)  1.50E+00
SORPTION COEFFICIENT AT SOURCE (ml/g)  1.14E+02
BULK DENSITY IN UNSAT ZONE (g/cm**3)  1.50E+00
UNSATURATED ZONE THICKNESS (m)  1.60E+01
```

|  |          |
|--|----------|
| SORPTION COEFFICIENT IN UNSAT ZONE (ml/g)      | 1.14E+02 |
| OPTIONAL LOSS RATE CONSTANT FOR SOURCE (y**-1) | 0.00E+00 |
| INITIAL MASS OR ACTIVITY (mg or Ci)            | 9.64E+05 |
| MOLECULAR WEIGHT (g/mole)                      | 1.00E+01 |
| SOLUBILITY LIMIT (mg/L)                        | 1.32E-01 |
| HALF-LIFE(S) OF CONTAMINANT AND PROGENY (y)    | 1.00E+38 |
| BULK DENSITY OF AQUIFER (g/cm**3)              | 1.90E+00 |
| POROSITY OF AQUIFER                            | 1.00E-01 |
| SORPTION COEFFICIENT(S) IN AQUIFER (ml/g)      | 0.00E+00 |
| DISPERSIVITY X DIRECTION (m)                   | 9.00E+00 |
| DISPERSIVITY Y DIRECTION (m)                   | 4.00E+00 |
| PORE VELOCITY (m/y)                            | 5.70E+02 |
| WELL SCREEN THICKNESS (m)                      | 1.50E+01 |
| DISTANCE TO RECEPTOR ALONG X AXIS (m)          | 2.30E+02 |
| DISTANCE TO RECEPTOR ALONG Y AXIS (m)          | 0.00E+00 |
| LIMITING CONTAMINANT GW CONCENTRATION (mg/L)   | 1.00E+00 |
| UNITS OF CONTAMINANT                           | mg       |

INPUT DATA FILE CREATED BY: *Sanderup* DATE 8/22/94

INPUT DATA CHECKED BY: *John V. Magnus* DATE 8/22/94

#### LIMITING SOIL CONCENTRATION CALCULATION

>>> VALUES CALCULATED IN SOURCE SUBROUTINE

\*\*\*\*\*

|   |            |
|---|------------|
| LEACH RATE CONSTANT (1/y)               | 1.9454E-04 |
| UNSATURATED PORE VELOCITY (m/y)         | 2.9412E-01 |
| DECAY CONSTANT(S) (1/y)                 | 0.0000E+00 |
| RETARDATION FACTOR(S) (SATURATED)       | 1.0000E+00 |
| RETARDATION FACTOR (UNSATURATED)        | 5.0394E+02 |
| SOLUBILITY LIMITED MASS (mg)            | 1.0178E+09 |
| SOLUBILITY LIMITED ACTIVITY (Ci)        | 0.0000E+00 |
| TRANSIT TIME IN UNSAT ZONE (years)      | 2.7414E+04 |
| FRACTION DECAYED DURING UNSAT TRANSPORT | 0.0000E+00 |

>>> EXPOSURE DATA FOR LIMITING SOIL CONCENTRATION

\*\*\*\*\*

|                                 |           |
|---------------------------------|-----------|
| INTEGRATION TIME (years)        | 1         |
| BODY WEIGHT (kg)                | 7.000E+01 |
| AVERAGING TIME (days)           | 2.555E+04 |
| WATER INTAKE RATE (L/d)         | 2.000E+00 |
| EXPOSURE FREQUENCY (days/year)  | 3.500E+02 |
| EXPOSURE DURATION (years)       | 7.000E+01 |
| RADIOLOGICAL DOSE LIMIT (rem/y) | 4.000E-03 |
| CARCINOGENIC RISK CRITERIA      | 1.000E-06 |
| HAZARD QUOTIENT                 | 1.000E+00 |

>>> RESULTS OF CALCULATIONS

\*\*\*\*\*

#### MAXIMUM NON RADIOLOGICAL CONTAMINANT CALCULATION

|  |               |
|--|---------------|
| MAXIMUM CONCENTRATION                                      | 1.33E-06 mg/L |
| AVERAGE CONCENTRATION                                      | 1.33E-06 mg/L |
| PEAK TIME (y):   | 2.741550E+04  |
| LIMITING SOIL CONCENTRATION (mg/m**3):                     | 1.614E+07     |
| LIMITING SOIL CONCENTRATION (mg/kg):                       | 1.076E+04     |
| LIMITING INVENTORY IN SOIL (mg):                           | 7.261E+11     |
| WARNING !!! THE LIMITING SOIL MASS OF 7.261E+11 mg         |               |
| EXCEEDS THE SOLUBILITY LIMITED SOURCE MASS OF 1.018E+09 mg |               |
| EXECUTION TIME (seconds)                                   | 3             |



## CFA Landfill II - toluene, waste oil inventory, representing alkyl benzenes

TIME OF RUN 14:12:22.6  
DATE OF RUN 08/07/94  
INPUT FILE NAME: toluene.inp  
OUTPUT FILE NAME: toluene.out

### =====

#### ACKNOWLEDGEMENT OF GOVERNMENT SPONSORSHIP AND LIMITATION OF LIABILITY

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\* Version Control Copy, Version 2.02 \*  
\* A semi-analytical model for the assessment \*  
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\* 10-11-93 \*  
\* Arthur S. Rood \*  
\* Idaho National Engineering Laboratory \*  
\* EG&G Idaho Inc. \*  
\* Subsurface and Environmental Modeling Unit \*  
\* PO Box 1625 \*  
\* Idaho Falls, Idaho 83415 \*  
\*\*\*\*\*

#### >>> TITLE OF PROJECT:

CFA Landfill II - toluene, waste oil inventory, representing alkyl benzenes

#### =====

#### GAUSSIAN QUADRATURE SOLUTION

#### MODEL OPTIONS

IMODE: 4

KFLAG: 1 (0)CONC VS TIME; (1)PEAK CONC AND LIMITING SOIL CONC

IMODEL:1 (1) SURF OR BURIED SOURCE; (2)POND SOURCE; (3) TABULATED SOURCE FUNCTION

#### >>> INPUT DATA

\*\*\*\*\*

|  |          |
|--|----------|
| NUMBER OF RADIOACTIVE PROGENY                | 0        |
| LENGTH OF SOURCE PARALLEL TO GW FLOW (m)     | 1.00E+02 |
| WIDTH OF SOURCE PERPENDICULAR TO GW FLOW (m) | 1.50E+02 |
| THICKNESS OF SOURCE (m)                      | 3.00E+00 |
| PERCOLATION RATE (darcy vel m/y)             | 1.00E-01 |
| VOLUMETRIC WATER CONTENT IN SOURCE           | 3.40E-01 |
| VOLUMETRIC WATER CONTENT IN UNSATURATED ZONE | 3.40E-01 |
| BULK DENSITY AT SOURCE (g/cm**3)             | 1.50E+00 |
| SORPTION COEFFICIENT AT SOURCE (ml/g)        | 9.00E-01 |
| BULK DENSITY IN UNSAT ZONE (g/cm**3)         | 1.50E+00 |
| UNSATURATED ZONE THICKNESS (m)               | 1.60E+01 |

|  |          |
|--|----------|
| SORPTION COEFFICIENT IN UNSAT ZONE (ml/g)      | 9.00E-01 |
| OPTIONAL LOSS RATE CONSTANT FOR SOURCE (y**-1) | 0.00E+00 |
| INITIAL MASS OR ACTIVITY (mg or Ci)            | 2.63E+07 |
| MOLECULAR WEIGHT (g/mole)                      | 1.00E+01 |
| SOLUBILITY LIMIT (mg/L)                        | 5.35E+02 |
| HALF-LIFE(S) OF CONTAMINANT AND PROGENY (y)    | 1.00E+38 |
| BULK DENSITY OF AQUIFER (g/cm**3)              | 1.90E+00 |
| POROSITY OF AQUIFER                            | 1.00E-01 |
| SORPTION COEFFICIENT(S) IN AQUIFER (ml/g)      | 0.00E+00 |
| DISPERSIVITY X DIRECTION (m)                   | 9.00E+00 |
| DISPERSIVITY Y DIRECTION (m)                   | 4.00E+00 |
| PORE VELOCITY (m/y)                            | 5.70E+02 |
| WELL SCREEN THICKNESS (m)                      | 1.50E+01 |
| DISTANCE TO RECEPTOR ALONG X AXIS (m)          | 2.30E+02 |
| DISTANCE TO RECEPTOR ALONG Y AXIS (m)          | 0.00E+00 |
| LIMITING CONTAMINANT GW CONCENTRATION (mg/L)   | 1.00E+00 |
| UNITS OF CONTAMINANT                           | mg       |

INPUT DATA FILE CREATED BY: Bondrup DATE 8/22/94

INPUT DATA CHECKED BY: John G. Magnus DATE 8/22/94

#### LIMITING SOIL CONCENTRATION CALCULATION

>>> VALUES CALCULATED IN SOURCE SUBROUTINE

\*\*\*\*\*

|   |            |
|---|------------|
| LEACH RATE CONSTANT (1/y)               | 1.9724E-02 |
| UNSATURATED PORE VELOCITY (m/y)         | 2.9412E-01 |
| DECAY CONSTANT(S) (1/y)                 | 0.0000E+00 |
| RETARDATION FACTOR(S) (SATURATED)       | 1.0000E+00 |
| RETARDATION FACTOR (UNSATURATED)        | 4.9706E+00 |
| SOLUBILITY LIMITED MASS (mg)            | 4.0687E+10 |
| SOLUBILITY LIMITED ACTIVITY (Ci)        | 0.0000E+00 |
| TRANSIT TIME IN UNSAT ZONE (years)      | 2.7040E+02 |
| FRACTION DECAYED DURING UNSAT TRANSPORT | 0.0000E+00 |

>>> EXPOSURE DATA FOR LIMITING SOIL CONCENTRATION

\*\*\*\*\*

|                                 |           |
|---------------------------------|-----------|
| INTEGRATION TIME (years)        | 1         |
| BODY WEIGHT (kg)                | 7.000E+01 |
| AVERAGING TIME (days)           | 2.555E+04 |
| WATER INTAKE RATE (L/d)         | 2.000E+00 |
| EXPOSURE FREQUENCY (days/year)  | 3.500E+02 |
| EXPOSURE DURATION (years)       | 7.000E+01 |
| RADIOLOGICAL DOSE LIMIT (rem/y) | 4.000E-03 |
| CARCINOGENIC RISK CRITERIA      | 1.000E-06 |
| HAZARD QUOTIENT                 | 1.000E+00 |

>>> RESULTS OF CALCULATIONS

\*\*\*\*\*

#### MAXIMUM NON RADIOLOGICAL CONTAMINANT CALCULATION

|  |               |
|--|---------------|
| MAXIMUM CONCENTRATION                  | 3.63E-03 mg/L |
| AVERAGE CONCENTRATION                  | 3.63E-03 mg/L |
| PEAK TIME (y):                         | 2.713225E+02  |
| LIMITING SOIL CONCENTRATION (mg/m**3): | 1.610E+05     |
| LIMITING SOIL CONCENTRATION (mg/kg):   | 1.073E+02     |
| LIMITING INVENTORY IN SOIL (mg):       | 7.244E+09     |
| EXECUTION TIME (seconds)               | 3             |

## CFA Landfill II - naphthalene, waste oil inventory

TIME OF RUN 14:12:10.0  
DATE OF RUN 08/07/94  
INPUT FILE NAME: naphale.inp  
OUTPUT FILE NAME: naphale.out

### =====

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\* Arthur S. Rood \*  
\* Idaho National Engineering Laboratory \*  
\* EG&G Idaho Inc. \*  
\* Subsurface and Environmental Modeling Unit \*  
\* PO Box 1625 \*  
\* Idaho Falls, Idaho 83415 \*  
\*\*\*\*\*

>>> TITLE OF PROJECT:  
CFA Landfill II - naphthalene, waste oil inventory

#### GAUSSIAN QUADRATURE SOLUTION

##### MODEL OPTIONS

IMODE: 4

KFLAG: 1 (0)CONC VS TIME; (1)PEAK CONC AND LIMITING SOIL CONC

IMODEL:1 (1) SURF OR BURIED SOURCE; (2)POND SOURCE; (3) TABULATED SOURCE FUNCTION

##### >>> INPUT DATA

\*\*\*\*\*

|  |          |
|--|----------|
| NUMBER OF RADIOACTIVE PROGENY                | 0        |
| LENGTH OF SOURCE PARALLEL TO GW FLOW (m)     | 1.00E+02 |
| WIDTH OF SOURCE PERPENDICULAR TO GW FLOW (m) | 1.50E+02 |
| THICKNESS OF SOURCE (m)                      | 3.00E+00 |
| PERCOLATION RATE (darcy vel m/y)             | 1.00E-01 |
| VOLUMETRIC WATER CONTENT IN SOURCE           | 3.40E-01 |
| VOLUMETRIC WATER CONTENT IN UNSATURATED ZONE | 3.40E-01 |
| BULK DENSITY AT SOURCE (g/cm**3)             | 1.50E+00 |
| SORPTION COEFFICIENT AT SOURCE (ml/g)        | 3.90E+00 |
| BULK DENSITY IN UNSAT ZONE (g/cm**3)         | 1.50E+00 |
| UNSATURATED ZONE THICKNESS (m)               | 1.60E+01 |

SORPTION COEFFICIENT IN UNSAT ZONE (ml/g) 3.90E+00  
 OPTIONAL LOSS RATE CONSTANT FOR SOURCE (y\*\*<sup>-1</sup>) 0.00E+00  
 INITIAL MASS OR ACTIVITY (mg or Ci) 1.29E+07  
 MOLECULAR WEIGHT (g/mole) 1.00E+01  
 SOLUBILITY LIMIT (mg/L) 3.17E+01  
 HALF-LIFE(S) OF CONTAMINANT AND PROGENY (y) 1.00E+38  
 BULK DENSITY OF AQUIFER (g/cm\*\*3) 1.90E+00  
 POROSITY OF AQUIFER 1.00E-01  
 SORPTION COEFFICIENT(S) IN AQUIFER (ml/g) 0.00E+00  
 DISPERSIVITY X DIRECTION (m) 9.00E+00  
 DISPERSIVITY Y DIRECTION (m) 4.00E+00  
 PORE VELOCITY (m/y) 5.70E+02  
 WELL SCREEN THICKNESS (m) 1.50E+01  
 DISTANCE TO RECEPTOR ALONG X AXIS (m) 2.30E+02  
 DISTANCE TO RECEPTOR ALONG Y AXIS (m) 0.00E+00  
 LIMITING CONTAMINANT GW CONCENTRATION (mg/L) 1.00E+00  
 UNITS OF CONTAMINANT mg

INPUT DATA FILE CREATED BY: *[Signature]* DATE 8/22/94

INPUT DATA CHECKED BY: *[Signature]* DATE 8/22/94

-----  
 LIMITING SOIL CONCENTRATION CALCULATION

>>> VALUES CALCULATED IN SOURCE SUBROUTINE

\*\*\*\*\*

LEACH RATE CONSTANT (1/y) 5.3850E-03  
 UNSATURATED PORE VELOCITY (m/y) 2.9412E-01  
 DECAY CONSTANT(S) (1/y) 0.0000E+00  
 RETARDATION FACTOR(S) (SATURATED) 1.0000E+00  
 RETARDATION FACTOR (UNSATURATED) 1.8206E+01  
 SOLUBILITY LIMITED MASS (mg) 8.8300E+09  
 SOLUBILITY LIMITED ACTIVITY (Ci) 0.0000E+00  
 TRANSIT TIME IN UNSAT ZONE (years) 9.9040E+02  
 FRACTION DECAYED DURING UNSAT TRANSPORT 0.0000E+00

>>> EXPOSURE DATA FOR LIMITING SOIL CONCENTRATION

\*\*\*\*\*

INTEGRATION TIME (years) 1  
 BODY WEIGHT (kg) 7.000E+01  
 AVERAGING TIME (days) 2.555E+04  
 WATER INTAKE RATE (L/d) 2.000E+00  
 EXPOSURE FREQUENCY (days/year) 3.500E+02  
 EXPOSURE DURATION (years) 7.000E+01  
 RADIOLOGICAL DOSE LIMIT (rem/y) 4.000E-03  
 CARCINOGENIC RISK CRITERIA 1.000E-06  
 HAZARD QUOTIENT 1.000E+00

>>> RESULTS OF CALCULATIONS

\*\*\*\*\*

MAXIMUM NON RADIOLOGICAL CONTAMINANT CALCULATION

MAXIMUM CONCENTRATION 4.90E-04 mg/L  
 AVERAGE CONCENTRATION 4.90E-04 mg/L  
 PEAK TIME (y): 9.914862E+02  
 LIMITING SOIL CONCENTRATION (mg/m\*\*3): 5.849E+05  
 LIMITING SOIL CONCENTRATION (mg/kg): 3.900E+02  
 LIMITING INVENTORY IN SOIL (mg): 2.632E+10  
 WARNING !!! THE LIMITING SOIL MASS OF 2.632E+10 mg  
 EXCEEDS THE SOLUBILITY LIMITED SOURCE MASS OF 8.830E+09 mg  
 EXECUTION TIME (seconds) 3

## CFA Landfill II - barium, waste oil inventory

TIME OF RUN 14:11:45.2

DATE OF RUN 08/07/94

INPUT FILE NAME: barium.inp

OUTPUT FILE NAME: barium.out

### =====

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\* Arthur S. Rood \*  
\* Idaho National Engineering Laboratory \*  
\* EG&G Idaho Inc. \*  
\* Subsurface and Environmental Modeling Unit \*  
\* PO Box 1625 \*  
\* Idaho Falls, Idaho 83415 \*  
\*\*\*\*\*

>>> TITLE OF PROJECT:

CFA Landfill II - barium, waste oil inventory

=====

#### GAUSSIAN QUADRATURE SOLUTION

##### MODEL OPTIONS

IMODE: 4

KFLAG: 1 (0)CONC VS TIME; (1)PEAK CONC AND LIMITING SOIL CONC

IMODEL:1 (1) SURF OR BURIED SOURCE; (2)POND SOURCE; (3) TABULATED SOURCE FUNCTION

>>> INPUT DATA

\*\*\*\*\*

|  |          |
|--|----------|
| NUMBER OF RADIOACTIVE PROGENY                | 0        |
| LENGTH OF SOURCE PARALLEL TO GW FLOW (m)     | 1.00E+02 |
| WIDTH OF SOURCE PERPENDICULAR TO GW FLOW (m) | 1.50E+02 |
| THICKNESS OF SOURCE (m)                      | 3.00E+00 |
| PERCOLATION RATE (darcy vel m/y)             | 1.00E-01 |
| VOLUMETRIC WATER CONTENT IN SOURCE           | 3.40E-01 |
| VOLUMETRIC WATER CONTENT IN UNSATURATED ZONE | 3.40E-01 |
| BULK DENSITY AT SOURCE (g/cm**3)             | 1.50E+00 |
| SORPTION COEFFICIENT AT SOURCE (ml/g)        | 5.00E+01 |
| BULK DENSITY IN UNSAT ZONE (g/cm**3)         | 1.50E+00 |
| UNSATURATED ZONE THICKNESS (m)               | 1.60E+01 |

|   |          |
|---|----------|
| SORPTION COEFFICIENT IN UNSAT ZONE (ml/g)                   | 5.00E+01 |
| OPTIONAL LOSS RATE CONSTANT FOR SOURCE (y** <sup>-1</sup> ) | 0.00E+00 |
| INITIAL MASS OR ACTIVITY (mg or Ci)                         | 2.02E+07 |
| MOLECULAR WEIGHT (g/mole)                                   | 1.00E+01 |
| SOLUBILITY LIMIT (mg/L)                                     | 9.35E+04 |
| HALF-LIFE(S) OF CONTAMINANT AND PROGENY (y)                 | 1.00E+38 |
| BULK DENSITY OF AQUIFER (g/cm**3)                           | 1.90E+00 |
| POROSITY OF AQUIFER   | 1.00E-01 |
| SORPTION COEFFICIENT(S) IN AQUIFER (ml/g)                   | 0.00E+00 |
| DISPERSIVITY X DIRECTION (m)                                | 9.00E+00 |
| DISPERSIVITY Y DIRECTION (m)                                | 4.00E+00 |
| PORE VELOCITY (m/y)   | 5.70E+02 |
| WELL SCREEN THICKNESS (m)                                   | 1.50E+01 |
| DISTANCE TO RECEPTOR ALONG X AXIS (m)                       | 2.30E+02 |
| DISTANCE TO RECEPTOR ALONG Y AXIS (m)                       | 0.00E+00 |
| LIMITING CONTAMINANT GW CONCENTRATION (mg/L)                | 3.00E+00 |
| UNITS OF CONTAMINANT  | mg       |

INPUT DATA FILE CREATED BY: S. Sander DATE 8/22/94

INPUT DATA CHECKED BY: J. O. Mayner DATE 8/22/94

#### LIMITING SOIL CONCENTRATION CALCULATION

>>> VALUES CALCULATED IN SOURCE SUBROUTINE

\*\*\*\*\*

|   |            |
|---|------------|
| LEACH RATE CONSTANT (1/y)               | 4.4244E-04 |
| UNSATURATED PORE VELOCITY (m/y)         | 2.9412E-01 |
| DECAY CONSTANT(S) (1/y)                 | 0.0000E+00 |
| RETARDATION FACTOR(S) (SATURATED)       | 1.0000E+00 |
| RETARDATION FACTOR (UNSATURATED)        | 2.2159E+02 |
| SOLUBILITY LIMITED MASS (mg)            | 3.1699E+14 |
| SOLUBILITY LIMITED ACTIVITY (Ci)        | 0.0000E+00 |
| TRANSIT TIME IN UNSAT ZONE (years)      | 1.2054E+04 |
| FRACTION DECAYED DURING UNSAT TRANSPORT | 0.0000E+00 |

>>> EXPOSURE DATA FOR LIMITING SOIL CONCENTRATION

\*\*\*\*\*

|                                 |           |
|---------------------------------|-----------|
| INTEGRATION TIME (years)        | 1         |
| BODY WEIGHT (kg)                | 7.000E+01 |
| AVERAGING TIME (days)           | 2.555E+04 |
| WATER INTAKE RATE (L/d)         | 2.000E+00 |
| EXPOSURE FREQUENCY (days/year)  | 3.500E+02 |
| EXPOSURE DURATION (years)       | 7.000E+01 |
| RADIOLOGICAL DOSE LIMIT (rem/y) | 4.000E-03 |
| CARCINOGENIC RISK CRITERIA      | 1.000E-06 |
| HAZARD QUOTIENT                 | 1.000E+00 |

>>> RESULTS OF CALCULATIONS

\*\*\*\*\*

#### MAXIMUM NON RADIOLOGICAL CONTAMINANT CALCULATION

|  |               |
|--|---------------|
| MAXIMUM CONCENTRATION                  | 6.33E-05 mg/L |
| AVERAGE CONCENTRATION                  | 6.33E-05 mg/L |
| PEAK TIME (y):                         | 1.20550E+04   |
| LIMITING SOIL CONCENTRATION (mg/m**3): | 2.129E+07     |
| LIMITING SOIL CONCENTRATION (mg/kg):   | 1.419E+04     |
| LIMITING INVENTORY IN SOIL (mg):       | 9.580E+11     |
| EXECUTION TIME (seconds)               | 3             |

## CFA Landfill II - zinc, waste oil inventory

TIME OF RUN 14:12:28.9  
DATE OF RUN 08/07/94  
INPUT FILE NAME: zinc.inp  
OUTPUT FILE NAME: zinc.out

### =====

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\* Arthur S. Rood \*  
\* Idaho National Engineering Laboratory \*  
\* EG&G Idaho Inc. \*  
\* Subsurface and Environmental Modeling Unit \*  
\* PO Box 1625 \*  
\* Idaho Falls, Idaho 83415 \*  
\*\*\*\*\*

>>> TITLE OF PROJECT:  
CFA Landfill II - zinc, waste oil inventory

#### -----

#### GAUSSIAN QUADRATURE SOLUTION

##### MODEL OPTIONS

IMODE: 4

KFLAG: 1 (0)CONC VS TIME; (1)PEAK CONC AND LIMITING SOIL CONC

IMODEL:1 (1) SURF OR BURIED SOURCE; (2)POND SOURCE; (3) TABULATED SOURCE FUNCTION

##### >>> INPUT DATA

\*\*\*\*\*

|  |          |
|--|----------|
| NUMBER OF RADIOACTIVE PROGENY                | 0        |
| LENGTH OF SOURCE PARALLEL TO GW FLOW (m)     | 1.00E+02 |
| WIDTH OF SOURCE PERPENDICULAR TO GW FLOW (m) | 1.50E+02 |
| THICKNESS OF SOURCE (m)                      | 3.00E+00 |
| PERCOLATION RATE (darcy vel m/y)             | 1.00E-01 |
| VOLUMETRIC WATER CONTENT IN SOURCE           | 3.40E-01 |
| VOLUMETRIC WATER CONTENT IN UNSATURATED ZONE | 3.40E-01 |
| BULK DENSITY AT SOURCE (g/cm**3)             | 1.50E+00 |
| SORPTION COEFFICIENT AT SOURCE (ml/g)        | 1.60E+01 |
| BULK DENSITY IN UNSAT ZONE (g/cm**3)         | 1.50E+00 |
| UNSATURATED ZONE THICKNESS (m)               | 1.60E+01 |

|  |          |
|--|----------|
| SORPTION COEFFICIENT IN UNSAT ZONE (ml/g)      | 1.60E+01 |
| OPTIONAL LOSS RATE CONSTANT FOR SOURCE (y**-1) | 0.00E+00 |
| INITIAL MASS OR ACTIVITY (mg or Ci)            | 7.30E+07 |
| MOLECULAR WEIGHT (g/mole)                      | 1.00E+01 |
| SOLUBILITY LIMIT (mg/L)                        | 1.30E+00 |
| HALF-LIFE(S) OF CONTAMINANT AND PROGENY (y)    | 1.00E+38 |
| BULK DENSITY OF AQUIFER (g/cm**3)              | 1.90E+00 |
| POROSITY OF AQUIFER                            | 1.00E-01 |
| SORPTION COEFFICIENT(S) IN AQUIFER (ml/g)      | 0.00E+00 |
| DISPERSIVITY X DIRECTION (m)                   | 9.00E+00 |
| DISPERSIVITY Y DIRECTION (m)                   | 4.00E+00 |
| PORE VELOCITY (m/y)                            | 5.70E+02 |
| WELL SCREEN THICKNESS (m)                      | 1.50E+01 |
| DISTANCE TO RECEPTOR ALONG X AXIS (m)          | 2.30E+02 |
| DISTANCE TO RECEPTOR ALONG Y AXIS (m)          | 0.00E+00 |
| LIMITING CONTAMINANT GW CONCENTRATION (mg/L)   | 1.00E+01 |
| UNITS OF CONTAMINANT                           | mg       |

INPUT DATA FILE CREATED BY: Sondum DATE 8/22/94

INPUT DATA CHECKED BY: Don O. Mayman DATE 8/22/94

#### LIMITING SOIL CONCENTRATION CALCULATION

>>> VALUES CALCULATED IN SOURCE SUBROUTINE

\*\*\*\*\*

|   |            |
|---|------------|
| LEACH RATE CONSTANT (1/y)               | 1.3695E-03 |
| UNSATURATED PORE VELOCITY (m/y)         | 2.9412E-01 |
| DECAY CONSTANT(S) (1/y)                 | 0.0000E+00 |
| RETARDATION FACTOR(S) (SATURATED)       | 1.0000E+00 |
| RETARDATION FACTOR (UNSATURATED)        | 7.1588E+01 |
| SOLUBILITY LIMITED MASS (mg)            | 1.4239E+09 |
| SOLUBILITY LIMITED ACTIVITY (Ci)        | 0.0000E+00 |
| TRANSIT TIME IN UNSAT ZONE (years)      | 3.8944E+03 |
| FRACTION DECAYED DURING UNSAT TRANSPORT | 0.0000E+00 |

>>> EXPOSURE DATA FOR LIMITING SOIL CONCENTRATION

\*\*\*\*\*

|                                 |           |
|---------------------------------|-----------|
| INTEGRATION TIME (years)        | 1         |
| BODY WEIGHT (kg)                | 7.000E+01 |
| AVERAGING TIME (days)           | 2.555E+04 |
| WATER INTAKE RATE (L/d)         | 2.000E+00 |
| EXPOSURE FREQUENCY (days/year)  | 3.500E+02 |
| EXPOSURE DURATION (years)       | 7.000E+01 |
| RADIOLOGICAL DOSE LIMIT (rem/y) | 4.000E-03 |
| CARCINOGENIC RISK CRITERIA      | 1.000E-06 |
| HAZARD QUOTIENT                 | 1.000E+00 |

>>> RESULTS OF CALCULATIONS

\*\*\*\*\*

#### MAXIMUM NON RADIOLOGICAL CONTAMINANT CALCULATION

|  |               |
|--|---------------|
| MAXIMUM CONCENTRATION                                      | 7.07E-04 mg/L |
| AVERAGE CONCENTRATION                                      | 7.07E-04 mg/L |
| PEAK TIME (y):   | 3.895498E+03  |
| LIMITING SOIL CONCENTRATION (mg/m**3):                     | 2.294E+07     |
| LIMITING SOIL CONCENTRATION (mg/kg):                       | 1.529E+04     |
| LIMITING INVENTORY IN SOIL (mg):                           | 1.032E+12     |
| WARNING !!! THE LIMITING SOIL MASS OF 1.032E+12 mg         |               |
| EXCEEDS THE SOLUBILITY LIMITED SOURCE MASS OF 1.424E+09 mg |               |
| EXECUTION TIME (seconds)                                   | 3             |



## CFA Landfill II - mercury, 2 kg inventory

TIME OF RUN 09:03:20.5

DATE OF RUN 10/27/94

INPUT FILE NAME: mercury.inp

OUTPUT FILE NAME: mercury.out

### ACKNOWLEDGEMENT OF GOVERNMENT SPONSORSHIP AND LIMITATION OF LIABILITY

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```
*****
*
*   This output was produced by the model:
*
*   GWSCREEN
*   Version Control Copy, Version 2.02
*   A semi-analytical model for the assessment
*   of the groundwater pathway from the leaching
*   of surficial and buried contamination and
*   release of contaminants from percolation ponds
*   10-11-93
*   Arthur S. Rood
*   Idaho National Engineering Laboratory
*   EG&G Idaho Inc.
*   Subsurface and Environmental Modeling Unit
*   PO Box 1625
*   Idaho Falls, Idaho 83415
*****
```

>>> TITLE OF PROJECT:

CFA Landfill II - mercury, 2 kg inventory

### GAUSSIAN QUADRATURE SOLUTION

#### MODEL OPTIONS

IMODE: 4

KFLAG: 1 (0)CONC VS TIME; (1)PEAK CONC AND LIMITING SOIL CONC

IMODEL:1 (1) SURF OR BURIED SOURCE; (2)POND SOURCE; (3) TABULATED SOURCE FUNCTION

#### >>> INPUT DATA

\*\*\*\*\*

|  |          |
|--|----------|
| NUMBER OF RADIOACTIVE PROGENY                | 0        |
| LENGTH OF SOURCE PARALLEL TO GW FLOW (m)     | 3.00E+02 |
| WIDTH OF SOURCE PERPENDICULAR TO GW FLOW (m) | 1.90E+02 |
| THICKNESS OF SOURCE (m)                      | 3.00E+00 |
| PERCOLATION RATE (darcy vel m/y)             | 1.00E-01 |
| VOLUMETRIC WATER CONTENT IN SOURCE           | 3.40E-01 |
| VOLUMETRIC WATER CONTENT IN UNSATURATED ZONE | 3.40E-01 |
| BULK DENSITY AT SOURCE (g/cm**3)             | 1.50E+00 |
| SORPTION COEFFICIENT AT SOURCE (ml/g)        | 1.00E+02 |
| BULK DENSITY IN UNSAT ZONE (g/cm**3)         | 1.50E+00 |
| UNSATURATED ZONE THICKNESS (m)               | 1.60E+01 |

|  |          |
|--|----------|
| SORPTION COEFFICIENT IN UNSAT ZONE (ml/g)      | 1.00E+02 |
| OPTIONAL LOSS RATE CONSTANT FOR SOURCE (y**-1) | 0.00E+00 |
| INITIAL MASS OR ACTIVITY (mg or Ci)            | 2.00E+06 |
| MOLECULAR WEIGHT (g/mole)                      | 1.00E+00 |
| SOLUBILITY LIMIT (mg/L)                        | 3.00E-02 |
| HALF-LIFE(S) OF CONTAMINANT AND PROGENY (y)    | 1.00E+38 |
| BULK DENSITY OF AQUIFER (g/cm**3)              | 1.90E+00 |
| POROSITY OF AQUIFER                            | 1.00E-01 |
| SORPTION COEFFICIENT(S) IN AQUIFER (ml/g)      | 0.00E+00 |
| DISPERSIVITY X DIRECTION (m)                   | 9.00E+00 |
| DISPERSIVITY Y DIRECTION (m)                   | 4.00E+00 |
| PORE VELOCITY (m/y)                            | 5.70E+02 |
| WELL SCREEN THICKNESS (m)                      | 1.50E+01 |
| DISTANCE TO RECEPTOR ALONG X AXIS (m)          | 1.50E+02 |
| DISTANCE TO RECEPTOR ALONG Y AXIS (m)          | 0.00E+00 |
| LIMITING CONTAMINANT GW CONCENTRATION (mg/L)   | 2.00E-03 |
| UNITS OF CONTAMINANT                           | mg       |

INPUT DATA FILE CREATED BY: J. Souders DATE 11/10/94

INPUT DATA CHECKED BY: John O. Meyerson DATE 11/10/94

#### LIMITING SOIL CONCENTRATION CALCULATION

##### >>> VALUES CALCULATED IN SOURCE SUBROUTINE

\*\*\*\*\*

|   |            |
|---|------------|
| LEACH RATE CONSTANT (1/y)               | 2.2172E-04 |
| UNSATURATED PORE VELOCITY (m/y)         | 2.9412E-01 |
| DECAY CONSTANT(S) (1/y)                 | 0.0000E+00 |
| RETARDATION FACTOR(S) (SATURATED)       | 1.0000E+00 |
| RETARDATION FACTOR (UNSATURATED)        | 4.4218E+02 |
| SOLUBILITY LIMITED MASS (mg)            | 7.7124E+08 |
| SOLUBILITY LIMITED ACTIVITY (Ci)        | 0.0000E+00 |
| TRANSIT TIME IN UNSAT ZONE (years)      | 2.4054E+04 |
| FRACTION DECAYED DURING UNSAT TRANSPORT | 0.0000E+00 |

##### >>> EXPOSURE DATA FOR LIMITING SOIL CONCENTRATION

\*\*\*\*\*

|                                 |           |
|---------------------------------|-----------|
| INTEGRATION TIME (years)        | 1         |
| BODY WEIGHT (kg)                | 7.000E+01 |
| AVERAGING TIME (days)           | 2.555E+04 |
| WATER INTAKE RATE (L/d)         | 2.000E+00 |
| EXPOSURE FREQUENCY (days/year)  | 3.500E+02 |
| EXPOSURE DURATION (years)       | 7.000E+01 |
| RADIOLOGICAL DOSE LIMIT (rem/y) | 4.000E-03 |
| CARCINOGENIC RISK CRITERIA      | 1.000E-06 |
| HAZARD QUOTIENT                 | 1.000E+00 |

##### >>> RESULTS OF CALCULATIONS

\*\*\*\*\*

#### MAXIMUM NON RADIOLOGICAL CONTAMINANT CALCULATION

|  |               |
|--|---------------|
| MAXIMUM CONCENTRATION                                      | 2.68E-06 mg/L |
| AVERAGE CONCENTRATION                                      | 2.68E-06 mg/L |
| PEAK TIME (y):   | 2.405570E+04  |
| LIMITING SOIL CONCENTRATION (mg/m**3):                     | 8.739E+03     |
| LIMITING SOIL CONCENTRATION (mg/kg):                       | 5.826E+00     |
| LIMITING INVENTORY IN SOIL (mg):                           | 1.494E+09     |
| WARNING !!! THE LIMITING SOIL MASS OF 1.494E+09 mg         |               |
| EXCEEDS THE SOLUBILITY LIMITED SOURCE MASS OF 7.712E+08 mg |               |
| EXECUTION TIME (seconds)                                   | 3             |

## CFA Landfill II - beryllium, 1 cubic meter in inventory (~1850 kg)

TIME OF RUN 08:55:32.3  
DATE OF RUN 10/28/94  
INPUT FILE NAME: berylliu.inp  
OUTPUT FILE NAME: berylliu.out

### ACKNOWLEDGEMENT OF GOVERNMENT SPONSORSHIP AND LIMITATION OF LIABILITY

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```
*****
*
*   This output was produced by the model:
*
*           GWSCREEN
*   Version Control Copy, Version 2.02
*   A semi-analytical model for the assessment
*   of the groundwater pathway from the leaching
*   of surficial and buried contamination and
*   release of contaminants from percolation ponds
*           10-11-93
*           Arthur S. Rood
*   Idaho National Engineering Laboratory
*           EG&G Idaho Inc.
*   Subsurface and Environmental Modeling Unit
*           PO Box 1625
*           Idaho Falls, Idaho 83415
*****
```

>>> TITLE OF PROJECT:  
CFA Landfill II - beryllium, 1 cubic meter in inventory (~1850 kg)

### GAUSSIAN QUADRATURE SOLUTION

#### MODEL OPTIONS

IMODE: 4

KFLAG: 1 (0)CONC VS TIME; (1)PEAK CONC AND LIMITING SOIL CONC

IMODEL:1 (1) SURF OR BURIED SOURCE; (2)POND SOURCE; (3) TABULATED SOURCE FUNCTION

#### >>> INPUT DATA

```
*****
NUMBER OF RADIOACTIVE PROGENY          0
LENGTH OF SOURCE PARALLEL TO GW FLOW (m) 3.00E+02
WIDTH OF SOURCE PERPENDICULAR TO GW FLOW (m) 1.90E+02
THICKNESS OF SOURCE (m) 3.00E+00
PERCOLATION RATE (darcy vel m/y) 1.00E-01
VOLUMETRIC WATER CONTENT IN SOURCE 3.40E-01
VOLUMETRIC WATER CONTENT IN UNSATURATED ZONE 3.40E-01
BULK DENSITY AT SOURCE (g/cm**3) 1.50E+00
SORPTION COEFFICIENT AT SOURCE (ml/g) 2.50E+02
BULK DENSITY IN UNSAT ZONE (g/cm**3) 1.50E+00
UNSATURATED ZONE THICKNESS (m) 1.60E+01
```

SORPTION COEFFICIENT IN UNSAT ZONE (m1/g) 2.50E+02  
 OPTIONAL LOSS RATE CONSTANT FOR SOURCE (y\*\*-1) 0.00E+00  
 INITIAL MASS OR ACTIVITY (mg or Ci) 1.85E+09  
 MOLECULAR WEIGHT (g/mole) 1.00E+00  
 SOLUBILITY LIMIT (mg/L) 1.00E-05  
 HALF-LIFE(S) OF CONTAMINANT AND PROGENY (y) 1.00E+38  
 BULK DENSITY OF AQUIFER (g/cm\*\*3) 1.90E+00  
 POROSITY OF AQUIFER 1.00E-01  
 SORPTION COEFFICIENT(S) IN AQUIFER (m1/g) 0.00E+00  
 DISPERSIVITY X DIRECTION (m) 9.00E+00  
 DISPERSIVITY Y DIRECTION (m) 4.00E+00  
 PORE VELOCITY (m/y) 5.70E+02  
 WELL SCREEN THICKNESS (m) 1.50E+01  
 DISTANCE TO RECEPTOR ALONG X AXIS (m) 1.50E+02  
 DISTANCE TO RECEPTOR ALONG Y AXIS (m) 0.00E+00  
 LIMITING CONTAMINANT GW CONCENTRATION (mg/L) 2.00E-05  
 UNITS OF CONTAMINANT mg

INPUT DATA FILE CREATED BY: J. Souding DATE 11/10/94

INPUT DATA CHECKED BY: John C. Mayman DATE 11/10/94

-----  
 LIMITING SOIL CONCENTRATION CALCULATION

>>> VALUES CALCULATED IN SOURCE SUBROUTINE

\*\*\*\*\*

LEACH RATE CONSTANT (1/y) 8.8808E-05  
 UNSATURATED PORE VELOCITY (m/y) 2.9412E-01  
 DECAY CONSTANT(S) (1/y) 0.0000E+00  
 RETARDATION FACTOR(S) (SATURATED) 1.0000E+00  
 RETARDATION FACTOR (UNSATURATED) 1.1039E+03  
 SOLUBILITY LIMITED MASS (mg) 6.4183E+05  
 SOLUBILITY LIMITED ACTIVITY (Ci) 0.0000E+00  
 TRANSIT TIME IN UNSAT ZONE (years) 6.0054E+04  
 FRACTION DECAYED DURING UNSAT TRANSPORT 0.0000E+00

>>> EXPOSURE DATA FOR LIMITING SOIL CONCENTRATION

\*\*\*\*\*

INTEGRATION TIME (years) 1  
 BODY WEIGHT (kg) 7.000E+01  
 AVERAGING TIME (days) 2.555E+04  
 WATER INTAKE RATE (L/d) 2.000E+00  
 EXPOSURE FREQUENCY (days/year) 3.500E+02  
 EXPOSURE DURATION (years) 7.000E+01  
 RADIOLOGICAL DOSE LIMIT (rem/y) 4.000E-03  
 CARCINOGENIC RISK CRITERIA 1.000E-06  
 HAZARD QUOTIENT 1.000E+00

>>> RESULTS OF CALCULATIONS

\*\*\*\*\*

MAXIMUM NON RADIOLOGICAL CONTAMINANT CALCULATION

MAXIMUM CONCENTRATION 9.92E-04 mg/L  
 AVERAGE CONCENTRATION 9.92E-04 mg/L  
 PEAK TIME (y): 6.005570E+04  
 LIMITING SOIL CONCENTRATION (mg/m\*\*3): 2.181E+02  
 LIMITING SOIL CONCENTRATION (mg/kg): 1.454E-01  
 LIMITING INVENTORY IN SOIL (mg): 3.730E+07  
 WARNING !!! THE LIMITING SOIL MASS OF 3.730E+07 mg  
 EXCEEDS THE SOLUBILITY LIMITED SOURCE MASS OF 6.418E+05 mg  
 EXECUTION TIME (seconds) 3

## CFA Landfill II - chromium, 268 kg of Cr III in inventory

TIME OF RUN 14:12:03.8

DATE OF RUN 08/07/94

INPUT FILE NAME: chromium.inp

OUTPUT FILE NAME: chromium.out

### ACKNOWLEDGEMENT OF GOVERNMENT SPONSORSHIP AND LIMITATION OF LIABILITY

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```
*****
*                                     *
*   This output was produced by the model:   *
*                                     *
*               GWSCREEN               *
*   Version Control Copy, Version 2.02   *
*   A semi-analytical model for the assessment *
*   of the groundwater pathway from the leaching *
*   of surficial and buried contamination and *
*   release of contaminants from percolation ponds *
*               10-11-93               *
*               Arthur S. Rood          *
*   Idaho National Engineering Laboratory *
*               EG&G Idaho Inc.         *
*   Subsurface and Environmental Modeling Unit *
*               PO Box 1625             *
*               Idaho Falls, Idaho 83415 *
*****
```

>>> TITLE OF PROJECT:

CFA Landfill II - chromium, 268 kg of Cr III in inventory

### GAUSSIAN QUADRATURE SOLUTION

#### MODEL OPTIONS

IMODE: 4

KFLAG: 1 (0)CONC VS TIME; (1)PEAK CONC AND LIMITING SOIL CONC

IMODEL:1 (1) SURF OR BURIED SOURCE; (2)POND SOURCE; (3) TABULATED SOURCE FUNCTION

>>> INPUT DATA

```
*****
NUMBER OF RADIOACTIVE PROGENY          0
LENGTH OF SOURCE PARALLEL TO GW FLOW (m) 1.00E+02
WIDTH OF SOURCE PERPENDICULAR TO GW FLOW (m) 1.50E+02
THICKNESS OF SOURCE (m)                 3.00E+00
PERCOLATION RATE (darcy vel m/y)        1.00E-01
VOLUMETRIC WATER CONTENT IN SOURCE       3.40E-01
VOLUMETRIC WATER CONTENT IN UNSATURATED ZONE 3.40E-01
BULK DENSITY AT SOURCE (g/cm**3)         1.50E+00
SORPTION COEFFICIENT AT SOURCE (ml/g)     1.20E+00
BULK DENSITY IN UNSAT ZONE (g/cm**3)      1.50E+00
UNSATURATED ZONE THICKNESS (m)           1.60E+01
```

|  |          |
|--|----------|
| SORPTION COEFFICIENT IN UNSAT ZONE (ml/g)      | 1.20E+00 |
| OPTIONAL LOSS RATE CONSTANT FOR SOURCE (y**-1) | 0.00E+00 |
| INITIAL MASS OR ACTIVITY (mg or Ci)            | 2.68E+08 |
| MOLECULAR WEIGHT (g/mole)                      | 1.00E+01 |
| SOLUBILITY LIMIT (mg/L)                        | 4.40E+05 |
| HALF-LIFE(S) OF CONTAMINANT AND PROGENY (y)    | 1.00E+38 |
| BULK DENSITY OF AQUIFER (g/cm**3)              | 1.90E+00 |
| POROSITY OF AQUIFER                            | 1.00E-01 |
| SORPTION COEFFICIENT(S) IN AQUIFER (ml/g)      | 0.00E+00 |
| DISPERSIVITY X DIRECTION (m)                   | 9.00E+00 |
| DISPERSIVITY Y DIRECTION (m)                   | 4.00E+00 |
| PORE VELOCITY (m/y)                            | 5.70E+02 |
| WELL SCREEN THICKNESS (m)                      | 1.50E+01 |
| DISTANCE TO RECEPTOR ALONG X AXIS (m)          | 2.30E+02 |
| DISTANCE TO RECEPTOR ALONG Y AXIS (m)          | 0.00E+00 |
| LIMITING CONTAMINANT GW CONCENTRATION (mg/L)   | 4.00E+01 |
| UNITS OF CONTAMINANT                           | mg       |

INPUT DATA FILE CREATED BY: *[Signature]* DATE 8/22/94

INPUT DATA CHECKED BY: *[Signature]* DATE 8/22/94

#### LIMITING SOIL CONCENTRATION CALCULATION

>>> VALUES CALCULATED IN SOURCE SUBROUTINE

\*\*\*\*\*

|   |            |
|---|------------|
| LEACH RATE CONSTANT (1/y)               | 1.5576E-02 |
| UNSATURATED PORE VELOCITY (m/y)         | 2.9412E-01 |
| DECAY CONSTANT(S) (1/y)                 | 0.0000E+00 |
| RETARDATION FACTOR(S) (SATURATED)       | 1.0000E+00 |
| RETARDATION FACTOR (UNSATURATED)        | 6.2941E+00 |
| SOLUBILITY LIMITED MASS (mg)            | 4.2372E+13 |
| SOLUBILITY LIMITED ACTIVITY (Ci)        | 0.0000E+00 |
| TRANSIT TIME IN UNSAT ZONE (years)      | 3.4240E+02 |
| FRACTION DECAYED DURING UNSAT TRANSPORT | 0.0000E+00 |

>>> EXPOSURE DATA FOR LIMITING SOIL CONCENTRATION

\*\*\*\*\*

|                                 |           |
|---------------------------------|-----------|
| INTEGRATION TIME (years)        | 1         |
| BODY WEIGHT (kg)                | 7.000E+01 |
| AVERAGING TIME (days)           | 2.555E+04 |
| WATER INTAKE RATE (L/d)         | 2.000E+00 |
| EXPOSURE FREQUENCY (days/year)  | 3.500E+02 |
| EXPOSURE DURATION (years)       | 7.000E+01 |
| RADIOLOGICAL DOSE LIMIT (rem/y) | 4.000E-03 |
| CARCINOGENIC RISK CRITERIA      | 1.000E-06 |
| HAZARD QUOTIENT                 | 1.000E+00 |

>>> RESULTS OF CALCULATIONS

\*\*\*\*\*

#### MAXIMUM NON RADIOLOGICAL CONTAMINANT CALCULATION

|  |               |
|--|---------------|
| MAXIMUM CONCENTRATION                  | 2.93E-02 mg/L |
| AVERAGE CONCENTRATION                  | 2.93E-02 mg/L |
| PEAK TIME (y):                         | 3.433719E+02  |
| LIMITING SOIL CONCENTRATION (mg/m**3): | 8.136E+06     |
| LIMITING SOIL CONCENTRATION (mg/kg):   | 5.424E+03     |
| LIMITING INVENTORY IN SOIL (mg):       | 3.661E+11     |
| EXECUTION TIME (seconds)               | 3             |

## CFA Landfill II - cadmium, limiting inventory (backwards calculation)

TIME OF RUN 15:18:17.7

DATE OF RUN 08/07/94

INPUT FILE NAME: cadmium.inp

OUTPUT FILE NAME: cadmium.out

### =====

#### ACKNOWLEDGEMENT OF GOVERNMENT SPONSORSHIP AND LIMITATION OF LIABILITY

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=====

\*\*\*\*\*

|  |   |
|--|---|
| *  | * |
| * This output was produced by the model:         | * |
| *  | * |
| * GWScreen                                       | * |
| * Version Control Copy, Version 2.02             | * |
| * A semi-analytical model for the assessment     | * |
| * of the groundwater pathway from the leaching   | * |
| * of surficial and buried contamination and      | * |
| * release of contaminants from percolation ponds | * |
| * 10-11-93                                       | * |
| * Arthur S. Rood                                 | * |
| * Idaho National Engineering Laboratory          | * |
| * EG&G Idaho Inc.                                | * |
| * Subsurface and Environmental Modeling Unit     | * |
| * PO Box 1625                                    | * |
| * Idaho Falls, Idaho 83415                       | * |

\*\*\*\*\*

>>> TITLE OF PROJECT:

CFA Landfill II - cadmium, limiting inventory (backwards calculation)

=====

#### GAUSSIAN QUADRATURE SOLUTION

##### MODEL OPTIONS

IMODE: 4

KFLAG: 1 (0)CONC VS TIME; (1)PEAK CONC AND LIMITING SOIL CONC

IMODEL:1 (1) SURF OR BURIED SOURCE; (2)POND SOURCE; (3) TABULATED SOURCE FUNCTION

>>> INPUT DATA

\*\*\*\*\*

|  |          |
|--|----------|
| NUMBER OF RADIOACTIVE PROGENY                | 0        |
| LENGTH OF SOURCE PARALLEL TO GW FLOW (m)     | 3.00E+02 |
| WIDTH OF SOURCE PERPENDICULAR TO GW FLOW (m) | 1.90E+02 |
| THICKNESS OF SOURCE (m)                      | 3.00E+00 |
| PERCOLATION RATE (darcy vel m/y)             | 1.00E-01 |
| VOLUMETRIC WATER CONTENT IN SOURCE           | 3.40E-01 |
| VOLUMETRIC WATER CONTENT IN UNSATURATED ZONE | 3.40E-01 |
| BULK DENSITY AT SOURCE (g/cm**3)             | 1.50E+00 |
| SORPTION COEFFICIENT AT SOURCE (ml/g)        | 6.00E+00 |
| BULK DENSITY IN UNSAT ZONE (g/cm**3)         | 1.50E+00 |
| UNSATURATED ZONE THICKNESS (m)               | 1.60E+01 |

SORPTION COEFFICIENT IN UNSAT ZONE (ml/g) 6.00E+00  
 OPTIONAL LOSS RATE CONSTANT FOR SOURCE (y\*\*<sup>-1</sup>) 0.00E+00  
 INITIAL MASS OR ACTIVITY (mg or Ci) 1.00E+00  
 MOLECULAR WEIGHT (g/mole) 1.00E+00  
 SOLUBILITY LIMIT (mg/L) 2.00E+00  
 HALF-LIFE(S) OF CONTAMINANT AND PROGENY (y) 1.00E+38  
 BULK DENSITY OF AQUIFER (g/cm\*\*3) 1.90E+00  
 POROSITY OF AQUIFER 1.00E-01  
 SORPTION COEFFICIENT(S) IN AQUIFER (ml/g) 0.00E+00  
 DISPERSIVITY X DIRECTION (m) 9.00E+00  
 DISPERSIVITY Y DIRECTION (m) 4.00E+00  
 PORE VELOCITY (m/y) 5.70E+02  
 WELL SCREEN THICKNESS (m) 1.50E+01  
 DISTANCE TO RECEPTOR ALONG X AXIS (m) 1.50E+02  
 DISTANCE TO RECEPTOR ALONG Y AXIS (m) 0.00E+00  
 LIMITING CONTAMINANT GW CONCENTRATION (mg/L) 5.00E-03  
 UNITS OF CONTAMINANT mg

INPUT DATA FILE CREATED BY: *J. Sordrup* DATE 1/11/95

INPUT DATA CHECKED BY: *John D. Maynard* DATE 1/11/95

-----  
 LIMITING SOIL CONCENTRATION CALCULATION

>>> VALUES CALCULATED IN SOURCE SUBROUTINE

\*\*\*\*\*

LEACH RATE CONSTANT (1/y) 3.5689E-03  
 UNSATURATED PORE VELOCITY (m/y) 2.9412E-01  
 DECAY CONSTANT(S) (1/y) 0.0000E+00  
 RETARDATION FACTOR(S) (SATURATED) 1.0000E+00  
 RETARDATION FACTOR (UNSATURATED) 2.7471E+01  
 SOLUBILITY LIMITED MASS (mg) 3.1943E+09  
 SOLUBILITY LIMITED ACTIVITY (Ci) 0.0000E+00  
 TRANSIT TIME IN UNSAT ZONE (years) 1.4944E+03  
 FRACTION DECAYED DURING UNSAT TRANSPORT 0.0000E+00

>>> EXPOSURE DATA FOR LIMITING SOIL CONCENTRATION

\*\*\*\*\*

INTEGRATION TIME (years) 1  
 BODY WEIGHT (kg) 7.000E+01  
 AVERAGING TIME (days) 2.555E+04  
 WATER INTAKE RATE (L/d) 2.000E+00  
 EXPOSURE FREQUENCY (days/year) 3.500E+02  
 EXPOSURE DURATION (years) 7.000E+01  
 RADIOLOGICAL DOSE LIMIT (rem/y) 4.000E-03  
 CARCINOGENIC RISK CRITERIA 1.000E-06  
 HAZARD QUOTIENT 1.000E+00

>>> RESULTS OF CALCULATIONS

\*\*\*\*\*

MAXIMUM NON RADIOLOGICAL CONTAMINANT CALCULATION

MAXIMUM CONCENTRATION 2.15E-11 mg/L  
 AVERAGE CONCENTRATION 2.15E-11 mg/L  
 PEAK TIME (y): 1.495455E+03  
 LIMITING SOIL CONCENTRATION (mg/m\*\*3): 1.361E+03  
 LIMITING SOIL CONCENTRATION (mg/kg): 9.073E-01  
 LIMITING INVENTORY IN SOIL (mg): 2.327E+08  
 EXECUTION TIME (seconds) 4

← Maximum and average concentrations  
 based on hypothetical 1-mg inventory.



## CFA Landfill II - nickel, limiting inventory (backwards calculation)

TIME OF RUN 15:18:30.4  
DATE OF RUN 08/07/94  
INPUT FILE NAME: nickel.inp  
OUTPUT FILE NAME: nickel.out

### ACKNOWLEDGEMENT OF GOVERNMENT SPONSORSHIP AND LIMITATION OF LIABILITY

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```
*****
*
*   This output was produced by the model:
*
*           GWSCREEN
*   Version Control Copy, Version 2.02
*   A semi-analytical model for the assessment
*   of the groundwater pathway from the leaching
*   of surficial and buried contamination and
*   release of contaminants from percolation ponds
*   10-11-93
*   Arthur S. Rood
*   Idaho National Engineering Laboratory
*   EG&G Idaho Inc.
*   Subsurface and Environmental Modeling Unit
*   PO Box 1625
*   Idaho Falls, Idaho 83415
*****
```

>>> TITLE OF PROJECT:  
CFA Landfill II - nickel, limiting inventory (backwards calculation)

### GAUSSIAN QUADRATURE SOLUTION

#### MODEL OPTIONS

IMODE: 4

KFLAG: 1 (0)CONC VS TIME; (1)PEAK CONC AND LIMITING SOIL CONC

IMODEL:1 (1) SURF OR BURIED SOURCE; (2)POND SOURCE; (3) TABULATED SOURCE FUNCTION

#### >>> INPUT DATA

```
*****
NUMBER OF RADIOACTIVE PROGENY          0
LENGTH OF SOURCE PARALLEL TO GW FLOW (m)  3.00E+02
WIDTH OF SOURCE PERPENDICULAR TO GW FLOW (m)  1.90E+02
THICKNESS OF SOURCE (m)                3.00E+00
PERCOLATION RATE (darcy vel m/y)        1.00E-01
VOLUMETRIC WATER CONTENT IN SOURCE      3.40E-01
VOLUMETRIC WATER CONTENT IN UNSATURATED ZONE  3.40E-01
BULK DENSITY AT SOURCE (g/cm**3)        1.50E+00
SORPTION COEFFICIENT AT SOURCE (ml/g)    1.00E+02
BULK DENSITY IN UNSAT ZONE (g/cm**3)    1.50E+00
UNSATURATED ZONE THICKNESS (m)          1.60E+01
```

|  |          |
|--|----------|
| SORPTION COEFFICIENT IN UNSAT ZONE (ml/g)      | 1.00E+02 |
| OPTIONAL LOSS RATE CONSTANT FOR SOURCE (y**-1) | 0.00E+00 |
| INITIAL MASS OR ACTIVITY (mg or Ci)            | 1.00E+00 |
| MOLECULAR WEIGHT (g/mole)                      | 1.00E+00 |
| SOLUBILITY LIMIT (mg/L)                        | 8.20E+01 |
| HALF-LIFE(S) OF CONTAMINANT AND PROGENY (y)    | 1.00E+38 |
| BULK DENSITY OF AQUIFER (g/cm**3)              | 1.90E+00 |
| POROSITY OF AQUIFER                            | 1.00E-01 |
| SORPTION COEFFICIENT(S) IN AQUIFER (ml/g)      | 0.00E+00 |
| DISPERSIVITY X DIRECTION (m)                   | 9.00E+00 |
| DISPERSIVITY Y DIRECTION (m)                   | 4.00E+00 |
| PORE VELOCITY (m/y)                            | 5.70E+02 |
| WELL SCREEN THICKNESS (m)                      | 1.50E+01 |
| DISTANCE TO RECEPTOR ALONG X AXIS (m)          | 1.50E+02 |
| DISTANCE TO RECEPTOR ALONG Y AXIS (m)          | 0.00E+00 |
| LIMITING CONTAMINANT GW CONCENTRATION (mg/L)   | 1.00E-01 |
| UNITS OF CONTAMINANT                           | mg       |

INPUT DATA FILE CREATED BY: J. Sanderup DATE 1/11/95

INPUT DATA CHECKED BY: Frank Meyer DATE 1/11/95

#### LIMITING SOIL CONCENTRATION CALCULATION

##### >>> VALUES CALCULATED IN SOURCE SUBROUTINE

|   |            |
|---|------------|
| LEACH RATE CONSTANT (1/y)               | 2.2172E-04 |
| UNSATURATED PORE VELOCITY (m/y)         | 2.9412E-01 |
| DECAY CONSTANT(S) (1/y)                 | 0.0000E+00 |
| RETARDATION FACTOR(S) (SATURATED)       | 1.0000E+00 |
| RETARDATION FACTOR (UNSATURATED)        | 4.4218E+02 |
| SOLUBILITY LIMITED MASS (mg)            | 2.1081E+12 |
| SOLUBILITY LIMITED ACTIVITY (Ci)        | 0.0000E+00 |
| TRANSIT TIME IN UNSAT ZONE (years)      | 2.4054E+04 |
| FRACTION DECAYED DURING UNSAT TRANSPORT | 0.0000E+00 |

##### >>> EXPOSURE DATA FOR LIMITING SOIL CONCENTRATION

|                                 |           |
|---------------------------------|-----------|
| INTEGRATION TIME (years)        | 1         |
| BODY WEIGHT (kg)                | 7.000E+01 |
| AVERAGING TIME (days)           | 2.555E+04 |
| WATER INTAKE RATE (L/d)         | 2.000E+00 |
| EXPOSURE FREQUENCY (days/year)  | 3.500E+02 |
| EXPOSURE DURATION (years)       | 7.000E+01 |
| RADIOLOGICAL DOSE LIMIT (rem/y) | 4.000E-03 |
| CARCINOGENIC RISK CRITERIA      | 1.000E-06 |
| HAZARD QUOTIENT                 | 1.000E+00 |

##### >>> RESULTS OF CALCULATIONS

\*\*\*\*\*

#### MAXIMUM NON RADIOLOGICAL CONTAMINANT CALCULATION

|  |               |
|--|---------------|
| MAXIMUM CONCENTRATION                  | 1.34E-12 mg/L |
| AVERAGE CONCENTRATION                  | 1.34E-12 mg/L |
| PEAK TIME (y):                         | 2.405570E+04  |
| LIMITING SOIL CONCENTRATION (mg/m**3): | 4.370E+05     |
| LIMITING SOIL CONCENTRATION (mg/kg):   | 2.913E+02     |
| LIMITING INVENTORY IN SOIL (mg):       | 7.472E+10     |
| EXECUTION TIME (seconds)               | 3             |

← Maximum and average concentrations based on hypothetical 1-mg inventory.

## CFA Landfill II - zinc, limiting inventory (backwards calculation)

TIME OF RUN 15:51:45.7  
DATE OF RUN 08/09/94  
INPUT FILE NAME: zinc.inp  
OUTPUT FILE NAME: zinc.out

### ACKNOWLEDGEMENT OF GOVERNMENT SPONSORSHIP AND LIMITATION OF LIABILITY

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```
*****
*                                     *
*   This output was produced by the model:   *
*                                     *
*               GWSCREEN               *
*   Version Control Copy, Version 2.02   *
*   A semi-analytical model for the assessment *
*   of the groundwater pathway from the leaching *
*   of surficial and buried contamination and *
*   release of contaminants from percolation ponds *
*   10-11-93                             *
*   Arthur S. Rood                         *
*   Idaho National Engineering Laboratory   *
*   EG&G Idaho Inc.                       *
*   Subsurface and Environmental Modeling Unit *
*   PO Box 1625                           *
*   Idaho Falls, Idaho 83415              *
*****
```

#### >>> TITLE OF PROJECT:

CFA Landfill II - zinc, limiting inventory (backwards calculation)

#### GAUSSIAN QUADRATURE SOLUTION

##### MODEL OPTIONS

IMODE: 4

KFLAG: 1 (0)CONC VS TIME; (1)PEAK CONC AND LIMITING SOIL CONC

IMODEL:1 (1) SURF OR BURIED SOURCE; (2)POND SOURCE; (3) TABULATED SOURCE FUNCTION

##### >>> INPUT DATA

\*\*\*\*\*

|  |          |
|--|----------|
| NUMBER OF RADIOACTIVE PROGENY                | 0        |
| LENGTH OF SOURCE PARALLEL TO GW FLOW (m)     | 3.00E+02 |
| WIDTH OF SOURCE PERPENDICULAR TO GW FLOW (m) | 1.90E+02 |
| THICKNESS OF SOURCE (m)                      | 3.00E+00 |
| PERCOLATION RATE (darcy vel m/y)             | 1.00E-01 |
| VOLUMETRIC WATER CONTENT IN SOURCE           | 3.40E-01 |
| VOLUMETRIC WATER CONTENT IN UNSATURATED ZONE | 3.40E-01 |
| BULK DENSITY AT SOURCE (g/cm**3)             | 1.50E+00 |
| SORPTION COEFFICIENT AT SOURCE (ml/g)        | 1.60E+01 |
| BULK DENSITY IN UNSAT ZONE (g/cm**3)         | 1.50E+00 |
| UNSATURATED ZONE THICKNESS (m)               | 1.60E+01 |

SORPTION COEFFICIENT IN UNSAT ZONE (ml/g) 1.60E+01  
 OPTIONAL LOSS RATE CONSTANT FOR SOURCE (y\*\*-1) 0.00E+00  
 INITIAL MASS OR ACTIVITY (mg or Ci) 1.00E+00  
 MOLECULAR WEIGHT (g/mole) 1.00E+00  
 SOLUBILITY LIMIT (mg/L) 1.30E+00  
 HALF-LIFE(S) OF CONTAMINANT AND PROGENY (y) 1.00E+38  
 BULK DENSITY OF AQUIFER (g/cm\*\*3) 1.90E+00  
 POROSITY OF AQUIFER 1.00E-01  
 SORPTION COEFFICIENT(S) IN AQUIFER (ml/g) 0.00E+00  
 DISPERSIVITY X DIRECTION (m) 9.00E+00  
 DISPERSIVITY Y DIRECTION (m) 4.00E+00  
 PORE VELOCITY (m/y) 5.70E+02  
 WELL SCREEN THICKNESS (m) 1.50E+01  
 DISTANCE TO RECEPTOR ALONG X AXIS (m) 1.50E+02  
 DISTANCE TO RECEPTOR ALONG Y AXIS (m) 0.00E+00  
 LIMITING CONTAMINANT GW CONCENTRATION (mg/L) 1.00E+01  
 UNITS OF CONTAMINANT mg

INPUT DATA FILE CREATED BY: *J. Souders* DATE 1/11/95

INPUT DATA CHECKED BY: *John B. Magnus* DATE 1/11/95

#### LIMITING SOIL CONCENTRATION CALCULATION

>>> VALUES CALCULATED IN SOURCE SUBROUTINE

\*\*\*\*\*

LEACH RATE CONSTANT (1/y) 1.3695E-03  
 UNSATURATED PORE VELOCITY (m/y) 2.9412E-01  
 DECAY CONSTANT(S) (1/y) 0.0000E+00  
 RETARDATION FACTOR(S) (SATURATED) 1.0000E+00  
 RETARDATION FACTOR (UNSATURATED) 7.1588E+01  
 SOLUBILITY LIMITED MASS (mg) 5.4108E+09  
 SOLUBILITY LIMITED ACTIVITY (Ci) 0.0000E+00  
 TRANSIT TIME IN UNSAT ZONE (years) 3.8944E+03  
 FRACTION DECAYED DURING UNSAT TRANSPORT 0.0000E+00

>>> EXPOSURE DATA FOR LIMITING SOIL CONCENTRATION

\*\*\*\*\*

INTEGRATION TIME (years) 1  
 BODY WEIGHT (kg) 7.000E+01  
 AVERAGING TIME (days) 2.555E+04  
 WATER INTAKE RATE (L/d) 2.000E+00  
 EXPOSURE FREQUENCY (days/year) 3.500E+02  
 EXPOSURE DURATION (years) 7.000E+01  
 RADIOLOGICAL DOSE LIMIT (rem/y) 4.000E-03  
 CARCINOGENIC RISK CRITERIA 1.000E-06  
 HAZARD QUOTIENT 1.000E+00

>>> RESULTS OF CALCULATIONS

\*\*\*\*\*

#### MAXIMUM NON RADIOLOGICAL CONTAMINANT CALCULATION

MAXIMUM CONCENTRATION 8.26E-12 mg/L  
 AVERAGE CONCENTRATION 8.26E-12 mg/L  
 PEAK TIME (y): 3.895539E+03  
 LIMITING SOIL CONCENTRATION (mg/m\*\*3): 7.081E+06  
 LIMITING SOIL CONCENTRATION (mg/kg): 4.721E+03  
 LIMITING INVENTORY IN SOIL (mg): 1.211E+12  
 WARNING !!! THE LIMITING SOIL MASS OF 1.211E+12 mg  
 EXCEEDS THE SOLUBILITY LIMITED SOURCE MASS OF 5.411E+09 mg  
 EXECUTION TIME (seconds) 4

← Maximum and average concentrations  
 based on hypothetical 1-mg inventory.

|  |          |
|--|----------|
| SORPTION COEFFICIENT IN UNSAT ZONE (ml/g)      | 1.60E+01 |
| OPTIONAL LOSS RATE CONSTANT FOR SOURCE (y**-1) | 0.00E+00 |
| INITIAL MASS OR ACTIVITY (mg or Ci)            | 1.00E+00 |
| MOLECULAR WEIGHT (g/mole)                      | 1.00E+00 |
| SOLUBILITY LIMIT (mg/L)                        | 1.30E+00 |
| HALF-LIFE(S) OF CONTAMINANT AND PROGENY (y)    | 1.00E+38 |
| BULK DENSITY OF AQUIFER (g/cm**3)              | 1.90E+00 |
| POROSITY OF AQUIFER                            | 1.00E-01 |
| SORPTION COEFFICIENT(S) IN AQUIFER (ml/g)      | 0.00E+00 |
| DISPERSIVITY X DIRECTION (m)                   | 9.00E+00 |
| DISPERSIVITY Y DIRECTION (m)                   | 4.00E+00 |
| PORE VELOCITY (m/y)                            | 5.70E+02 |
| WELL SCREEN THICKNESS (m)                      | 1.50E+01 |
| DISTANCE TO RECEPTOR ALONG X AXIS (m)          | 1.50E+02 |
| DISTANCE TO RECEPTOR ALONG Y AXIS (m)          | 0.00E+00 |
| LIMITING CONTAMINANT GW CONCENTRATION (mg/L)   | 1.00E+01 |
| UNITS OF CONTAMINANT                           | mg       |

INPUT DATA FILE CREATED BY: *J. Sordump* DATE 8/22/94

INPUT DATA CHECKED BY: *John A. Magnuson* DATE 8/12/94

#### \*\*\*\*\* LIMITING SOIL CONCENTRATION CALCULATION

>>> VALUES CALCULATED IN SOURCE SUBROUTINE

\*\*\*\*\*

|   |            |
|---|------------|
| LEACH RATE CONSTANT (1/y)               | 1.3695E-03 |
| UNSATURATED PORE VELOCITY (m/y)         | 2.9412E-01 |
| DECAY CONSTANT(S) (1/y)                 | 0.0000E+00 |
| RETARDATION FACTOR(S) (SATURATED)       | 1.0000E+00 |
| RETARDATION FACTOR (UNSATURATED)        | 7.1588E+01 |
| SOLUBILITY LIMITED MASS (mg)            | 5.4108E+09 |
| SOLUBILITY LIMITED ACTIVITY (Ci)        | 0.0000E+00 |
| TRANSIT TIME IN UNSAT ZONE (years)      | 3.8944E+03 |
| FRACTION DECAYED DURING UNSAT TRANSPORT | 0.0000E+00 |

>>> EXPOSURE DATA FOR LIMITING SOIL CONCENTRATION

\*\*\*\*\*

|                                 |           |
|---------------------------------|-----------|
| INTEGRATION TIME (years)        | 1         |
| BODY WEIGHT (kg)                | 7.000E+01 |
| AVERAGING TIME (days)           | 2.555E+04 |
| WATER INTAKE RATE (L/d)         | 2.000E+00 |
| EXPOSURE FREQUENCY (days/year)  | 3.500E+02 |
| EXPOSURE DURATION (years)       | 7.000E+01 |
| RADIOLOGICAL DOSE LIMIT (rem/y) | 4.000E-03 |
| CARCINOGENIC RISK CRITERIA      | 1.000E-06 |
| HAZARD QUOTIENT                 | 1.000E+00 |

>>> RESULTS OF CALCULATIONS

\*\*\*\*\*

#### MAXIMUM NON RADIOLOGICAL CONTAMINANT CALCULATION

|  |               |
|--|---------------|
| MAXIMUM CONCENTRATION                                      | 8.26E-12 mg/L |
| AVERAGE CONCENTRATION                                      | 8.26E-12 mg/L |
| PEAK TIME (y):   | 3.895539E+03  |
| LIMITING SOIL CONCENTRATION (mg/m**3):                     | 7.081E+06     |
| LIMITING SOIL CONCENTRATION (mg/kg):                       | 4.721E+03     |
| LIMITING INVENTORY IN SOIL (mg):                           | 1.211E+12     |
| WARNING !!! THE LIMITING SOIL MASS OF 1.211E+12 mg         |               |
| EXCEEDS THE SOLUBILITY LIMITED SOURCE MASS OF 5.411E+09 mg |               |
| EXECUTION TIME (seconds)                                   | 4             |